



1/36

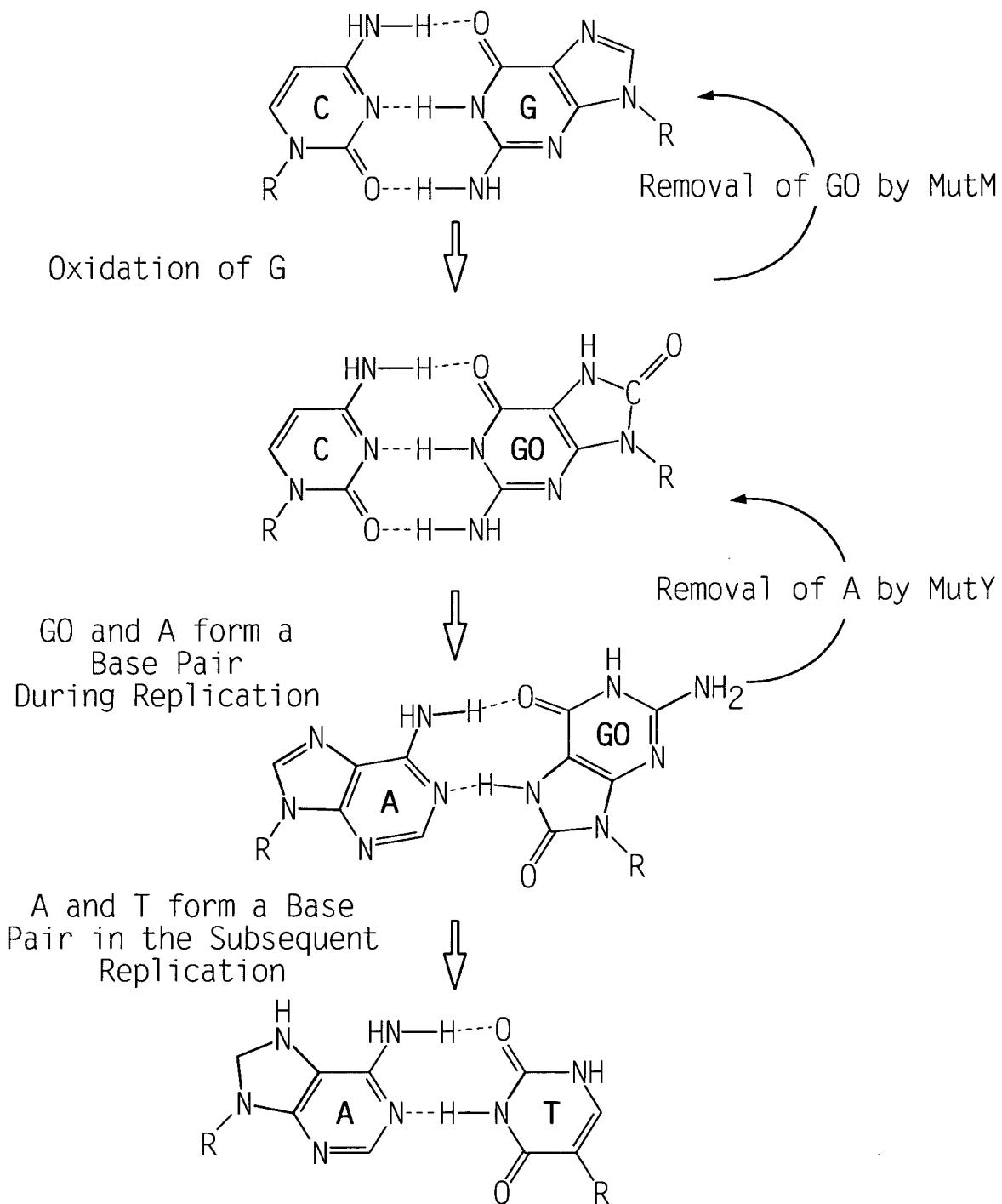


FIG. 1



2/36

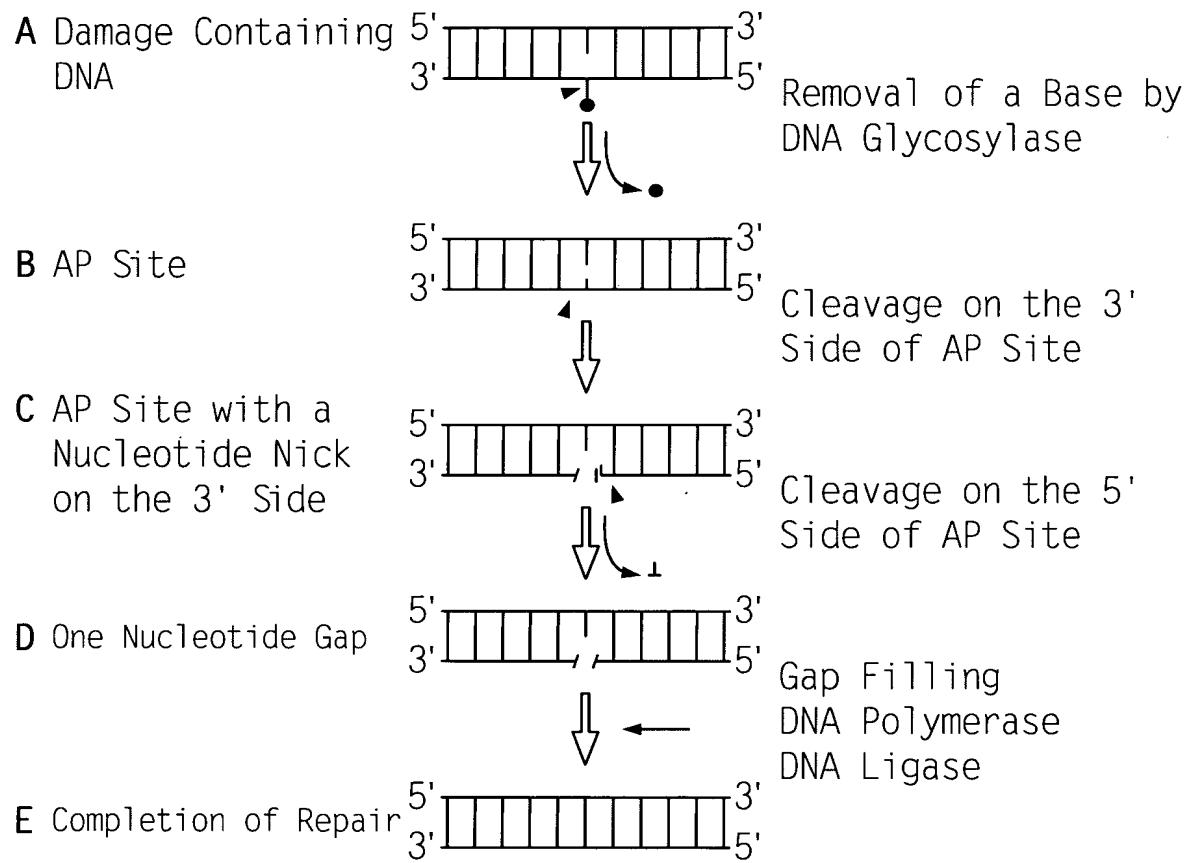


FIG. 2



3/36

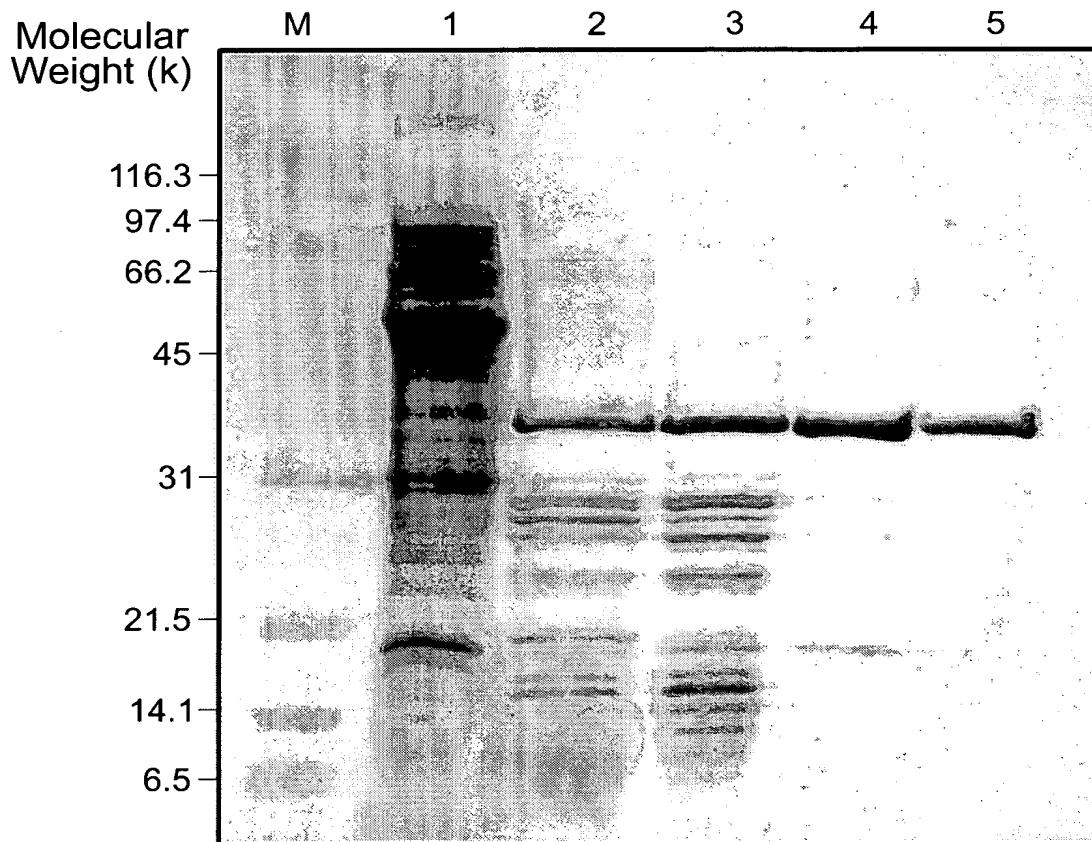


FIG. 3



4/36

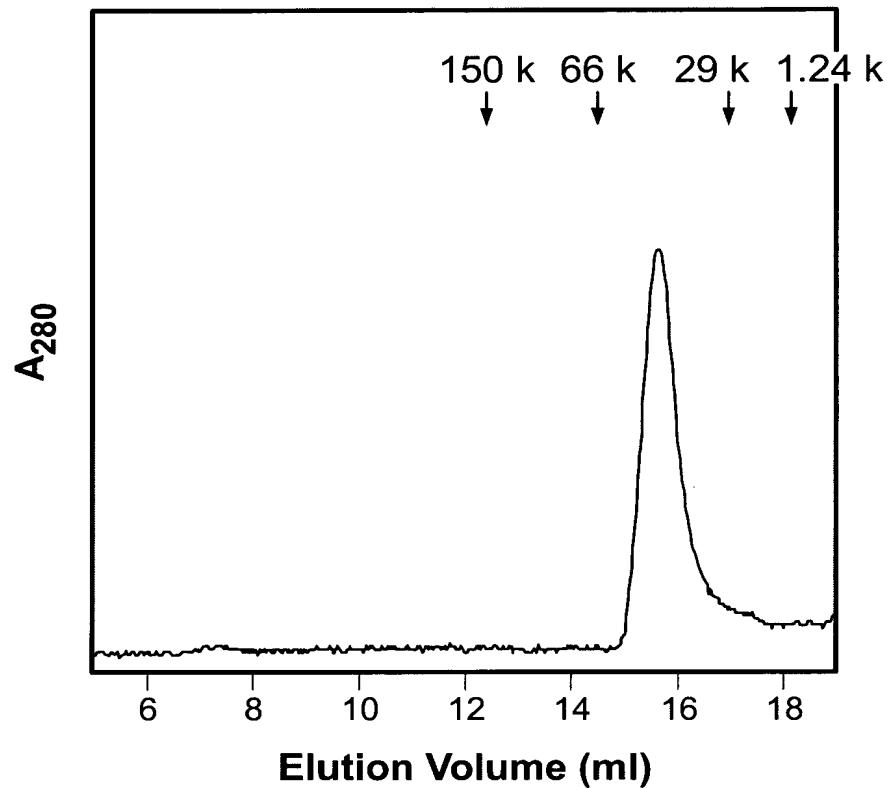


FIG. 4

Tth MutY	1	MEAWRKALIAWYREN-ARP[P][R]	[E]	-KDP[TRV]VSE[VE]QQTRNEQALPYYRREFL	53
Hsa MutY	51	CDGL ARQFEEVVL QASISSSYH LRDVAE VITAFRGSLLSWYDQE-KRD[P]WRRRADEMID	[D]	-RRAYA[WSE]M[QQT]NATIVLNNYTGWM	139
Spo MutY	1	MSDSNHFLDLHSYTQLEVERFRESI[D]Q[D]KT-KRIPWKKCICPPSEDSPLEDWEQPVQRLEYV	[S]	-QQTRNEFTVKRYYT[KM]	88
Eco MutY	1	[MQASQFSAQILDWDYDKYGRK]LPQD	[D]	-KTP[KW]L[SE]MLQQD[DNATVLP]F[ERFM]	56
Eco EndoIII	1	MNKAKRLE[L]IRLREN--NPHP TT	[E]LN	-FSSPELLIANLSSAQADVSINKATAKY	55
Tth MutY	54	ERFP[KAL][AAS]-E-FVLRW[D]AGYYR-RAEH[HRL]ARSVEEL--	-ppsf[AE[R-G][PG]	-GPIYTAAGAAVASTAFGERVAAV[G]N[RRV]SRLFA[RES	145
Hsa MutY	140	QKWP[T]QDLASAS-[E-FVNQLWASL]GYS-RGRR[QEGARKVWEELGGIMPR]AT[T]QQL[PGVGRYTAGAI]AAT[AFGQATGVWVGWARY]ICR[RAI]GA	-[T]QQL[PGVGRYTAGAI]AAT[AFGQATGVWVGWARY]ICR[RAI]GA	237	
Spo MutY	89	ETLP[T]KSCASAE-YNTVOMPLWSG[GFYT-CKR]LIAOACQLAKLHSE[PTGDFWAKGP]GCPYTAGAVI-SLAWKQP[T]GLVGDGNV[RV]SRLA[HS	-[T]QQL[PGVGRYTAGAI]AAT[AFGQATGVWVGWARY]ICR[RAI]GA	187	
Eco MutY	57	ARFP[VMTDLANAP-D-FVLMH[L]WGD]GYYA-PARNL[KAQDVATLGGKFPE]FEEMA-APGMGRSTAGAI[SLGKHFP1LDGNWKR]ARCYAVSG	-[T]QQL[PGVGRYTAGAI]AAT[AFGQATGVWVGWARY]ICR[RAI]GA	153	
Eco EndoIII	56	PVANIPAM[ELGVE-GVKT]YTKITGLYNSKA[ENI]KTCR[IL]LEQHNGVPE[DRAA]E-APGMGRKTANV[VI]NTAFGWPTI[ND]FTRVCNR[QF]APG	-[T]QQL[PGVGRYTAGAI]AAT[AFGQATGVWVGWARY]ICR[RAI]GA	153	
Tth MutY	146	-PK-EKE[FIA][AQG]-PEGVDPGVANOA-MELQ[ATVCLPKRPGCACP]GAFCRG-	-KEAPGRYP-----	-KEAPGRYP-----	210
Hsa MutY	238	DPSSTLV[SQQL]WG[IAQQ]VDP-ARPGDFNQAA[AME]S[AVT]C[TPQR]LC[SCOP]V[SLCRA]RQ[RE]Q[QL]AS[GS]LSSGPDV[ECA]PNTGQ[CHL]CLPPSEP[WD]	-VDP[PSV]W-EPSFQLQ[RA]Q[ALQ]E[ORWAGP]----	-VDP[PSV]W-EPSFQLQ[RA]Q[ALQ]E[ORWAGP]----	336
Spo MutY	188	DCSKGKANAL[W]KANE[VDP-WRPGD]FNOA[MLSPN]TCTPQSPRC[SV]C[UP]P1[SE]I[C]KAYQ---	-EQNLVRDGNT[KYD]---IEDVPCN-I[CI]TDIPS-----	-EQNLVRDGNT[KYD]---IEDVPCN-I[CI]TDIPS-----	276
Eco MutY	154	WPGKKEVENK[WS]SE[NT]PA-VGVERENQAM[DLGAM]CTRSKP[KCS]CPLQN[G]C[LA]-----	-AANNSWALYP-----	-AANNSWALYP-----	225
Eco EndoIII	154	-KN-----VEQ[FEKLK]WPA-EFKVDC[HLW]L[HGRYTCIARKPRCGSCT]EDLC[Y]-----	-P-----	-P-----	205
Tth MutY	211	RRAK-----EER-LVALVLLGRKG-----VHLER[EGR]-----FQG[IYGY]P[FPP]-FELP-[GRE]AA[FGVRS-]	-RP-----	-RP-----	266
Hsa MutY	337	QTLGV-- -VNFP[KASR]PPRE[SSAT]C[LEQ]P[G]A-- -LGAQ[TLV]QRP[S]G[EL]AGL[MEFPSV]W-EPSFQLQ[RA]Q[ALQ]E[ORWAGP]---	-L[PATHL]RHL	-L[PATHL]RHL	425
Spo MutY	277	EDLQNWWVARYPVHPAKTKQRE-ERALVVIFQKTDPS[TEKEFFL]RKRP[S]AGL[AGL]WDFP[T]IEFGQF[SPK]KDM[AE]FQ[KS]I[AQW]I[S]ND[SRSLIK]KQ[SR]	-EDEWL[AQR]P[S]G[L]W[G]LYC[EP]FAD-[EE]S-----	-EDEWL[AQR]P[S]G[L]W[G]LYC[EP]FAD-[EE]S-----	375
Eco MutY	226	QTL-----PER---TGYFLLQH-----	-LRQWL[AQR]-----	-LRQWL[AQR]-----	287
Eco EndoIII	206	-K-----	-EKVD-----	-EKVD-----	206
Tth MutY	267	[GEVRI]A[THRLR-----VER-GAL[EGEGEDPMWKR]P-[WLRKA]P-[AH]-----	-AGVPLPDA	-AGVPLPDA	325
Hsa MutY	426	GEVWTFSH[KL]TYQVYGLALEGQTPVTWPPGARN[TOE]FHTAAV[STANKV]FVFR[QGQ]P[TCMGSKRSQVSSP]CSRKKPRMGQQLDNFFRHT[S]D[LS]NSAAQ	-FKEPKLTSARRIVTKAEC	-FKEPKLTSARRIVTKAEC	535
Spo MutY	376	GRYLH[FS]HFRKTSHV[FAIAS---PDI V[NEDFF]SOSD]EHVGM[C---ELG]N[MYRA]E[EIKKR]-----	-VTSLSN-----	-VTSLSN-----	461
Eco MutY	288	TAFR[SHFHD-----IP-----M[PVSSFTGCMD-----EGNALWNLNAQ]P[PSVG-----LAAD[VER]-----LLQQLR]G[PV]	-IP-----M[PVSSFTGCMD-----EGNALWNLNAQ]P[PSVG-----LAAD[VER]-----LLQQLR]G[PV]	350	

Tth (*Thermus thermophilus* HB8). Hsa (*Homo sapiens*). Spo (*Schizosaccharomyces pombe*). Eco (*Escherichia coli*)
 # Residue essential for N-glycosylase activity * Residues constituting an iron-sulfur cluster

FIG. 5

6/36

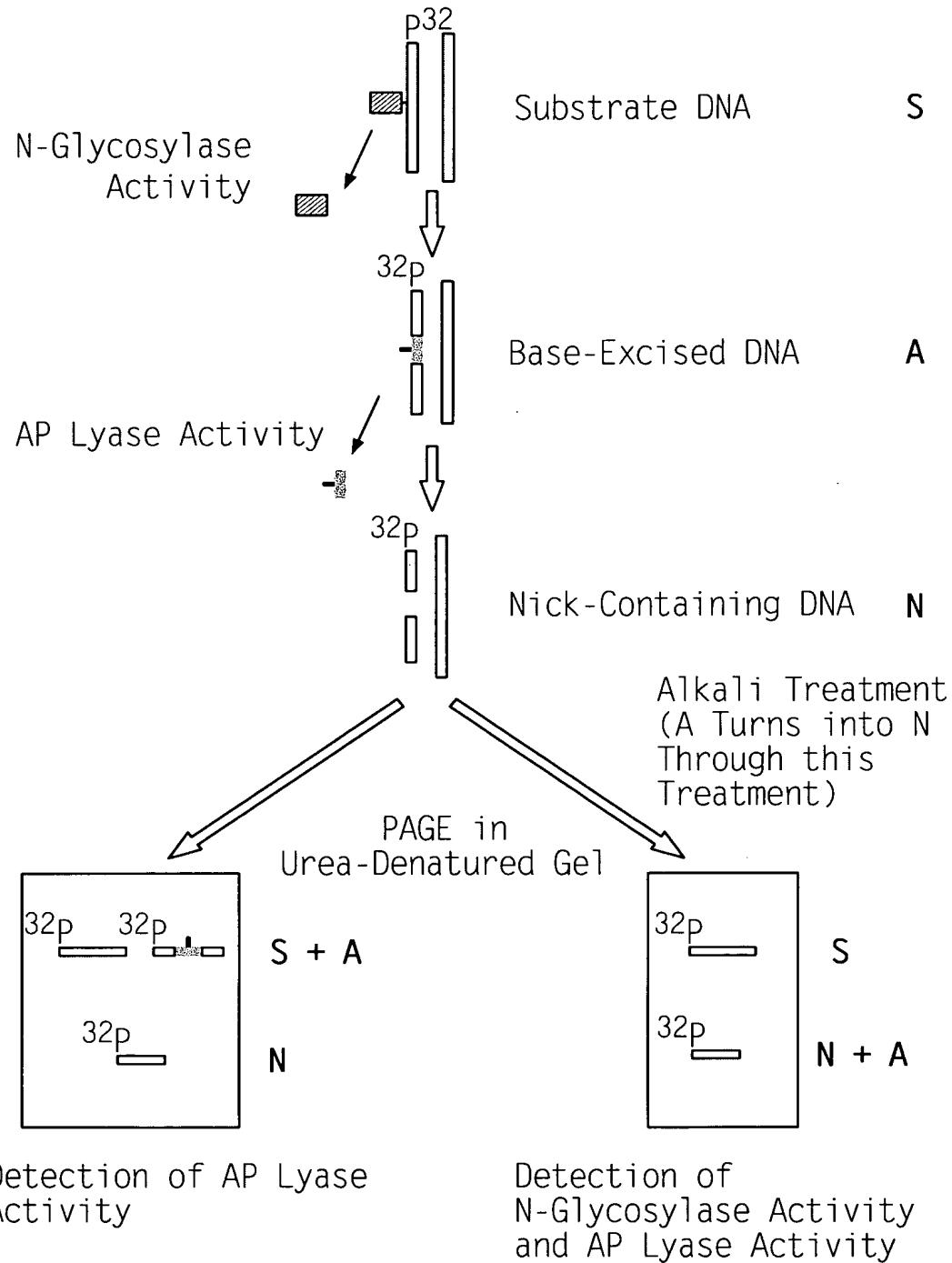


FIG. 6



7/36

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

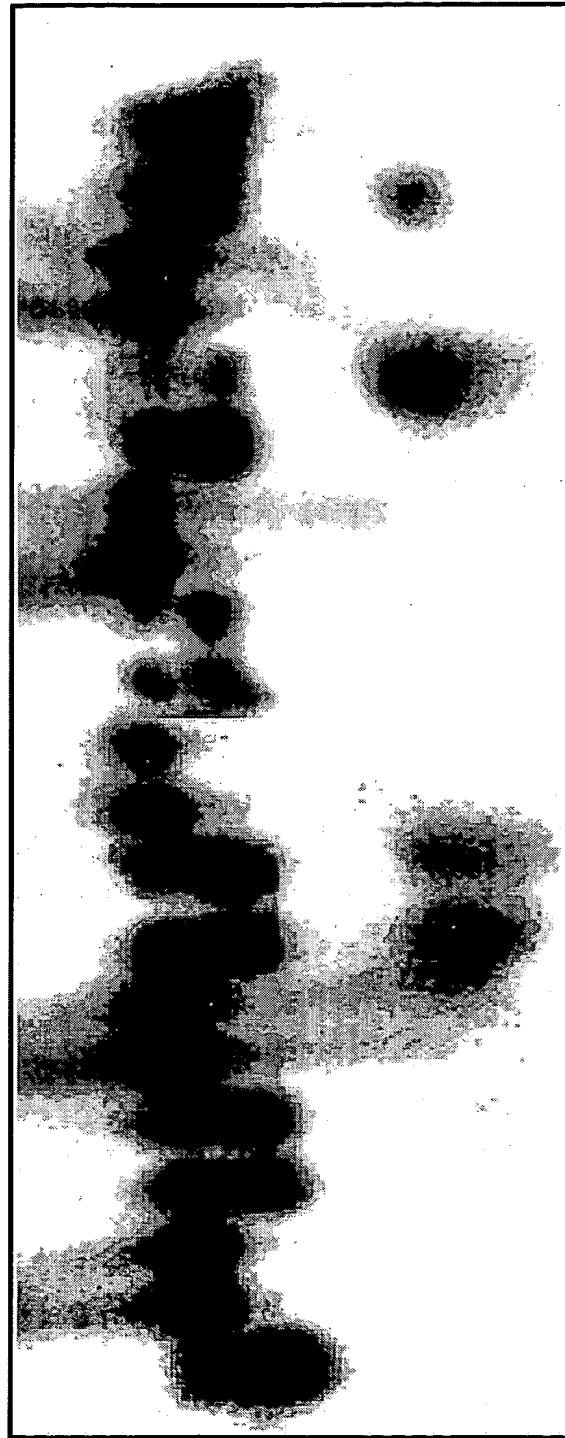


FIG. 7



8/36

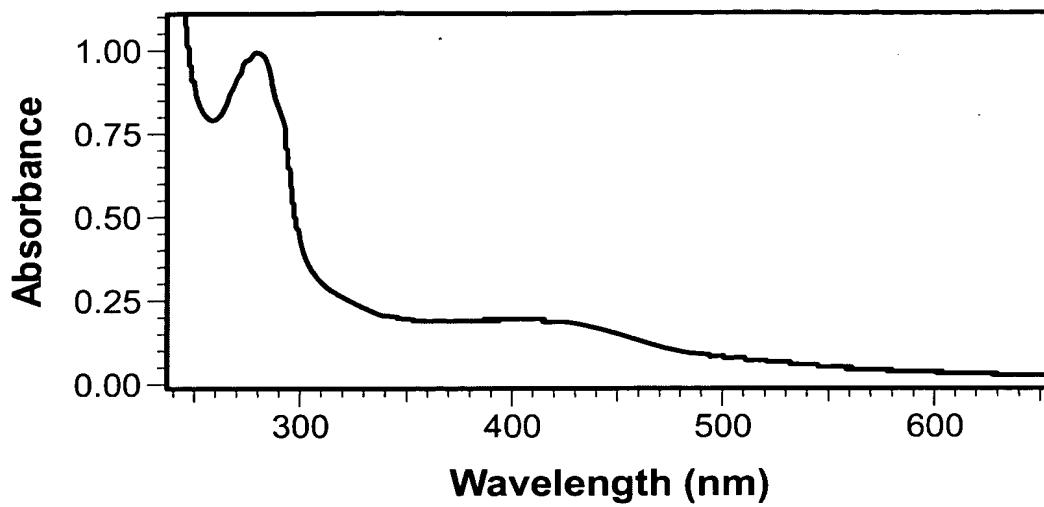


FIG. 8

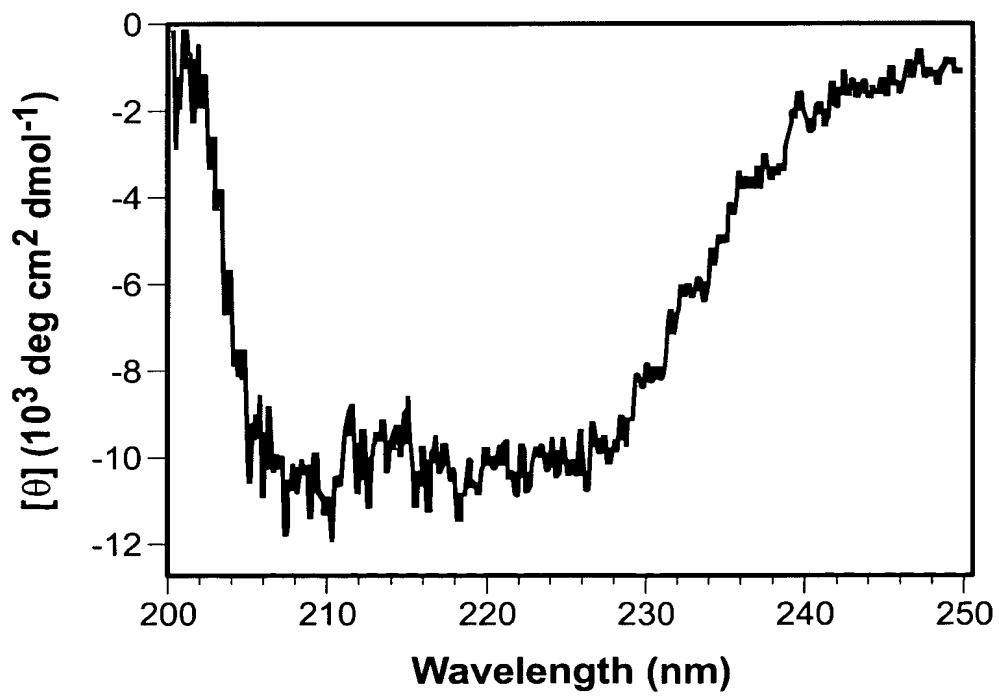


FIG. 9



9/36

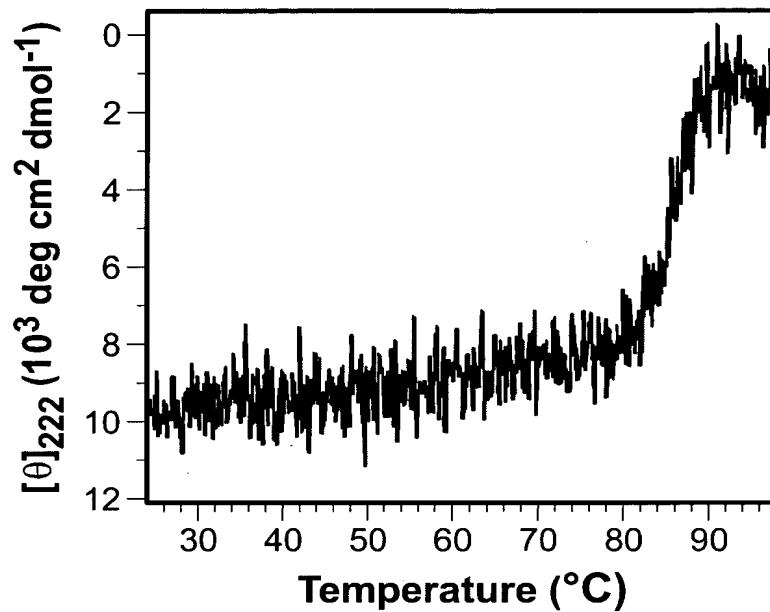


FIG. 10



10/36

5' - [³²P]AGATCTTGACGGGAAAYCCGAATTGGCGAACGTGGCGAG-3'
3' - AATCTAGAACTGCCCTTXGGCTTAAGCCGTTGCACCGCTCTT-5'

X : G0, G, C, T Y : A, G

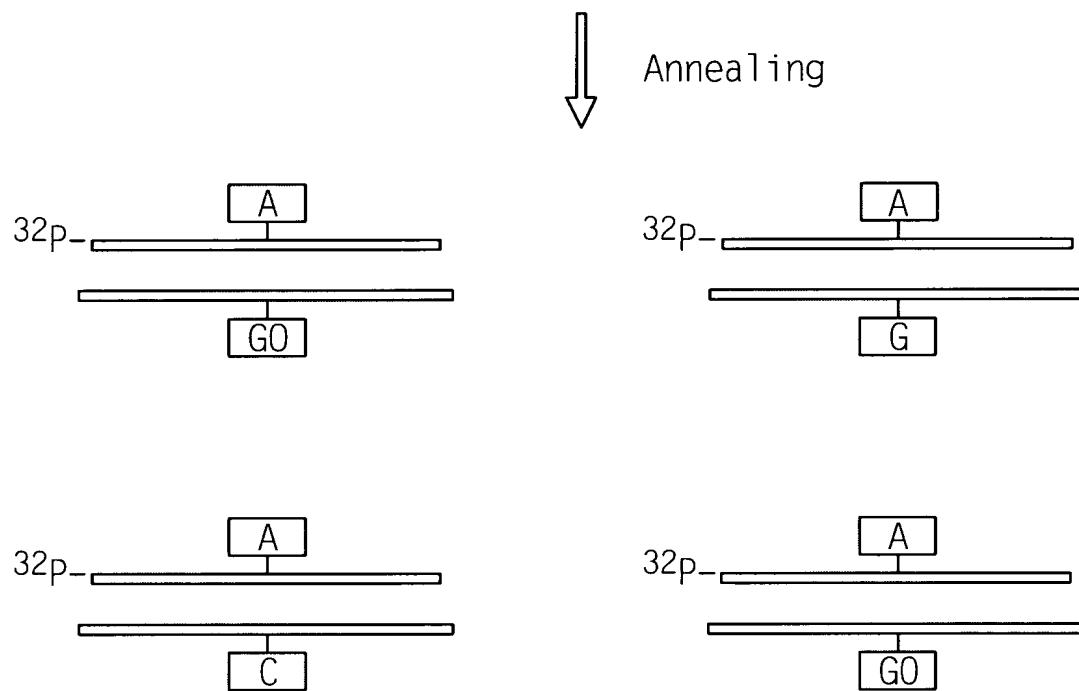


FIG. 11



11/36

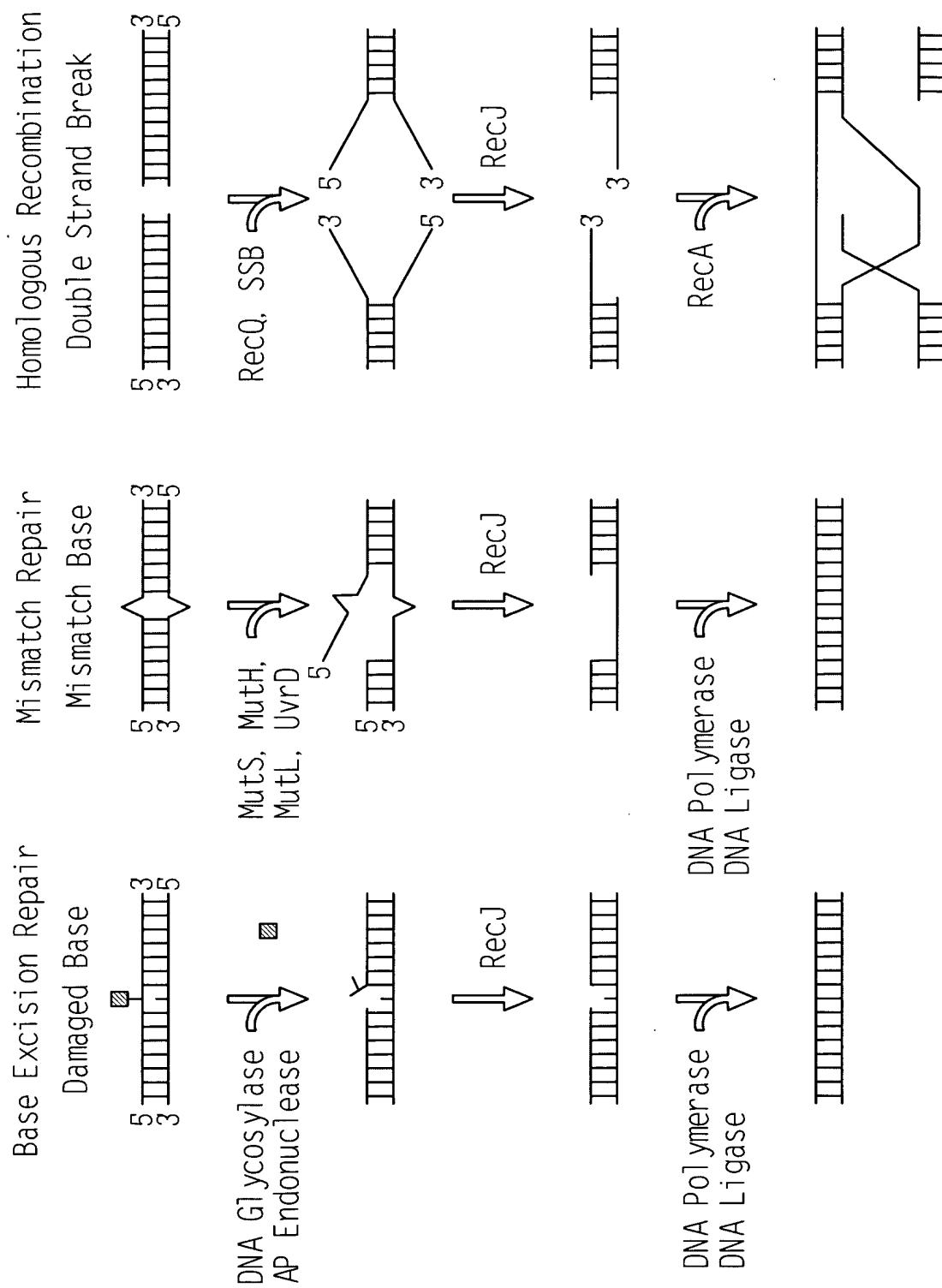


FIG. 12



Appln No.: 09/938,901

Page 12 of 36

Applicant(s): Kuramitsu, et al.

NOVEL DNA REPAIR ENZYMES, NUCLEIC ACIDS
ENCODING DNA REPAIR ENZYMES AND METHODS OF
USING THEM

12/36

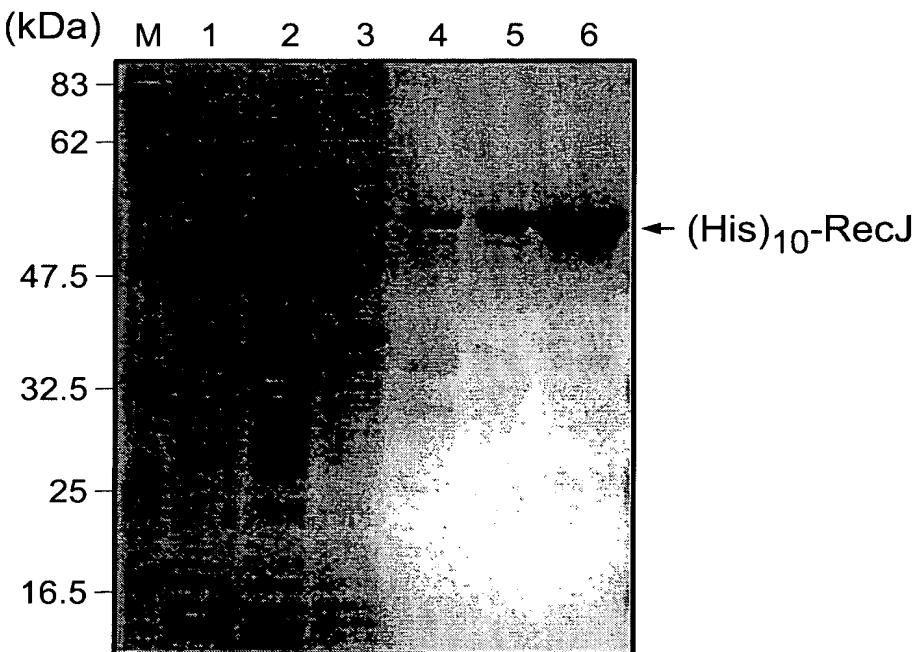


FIG. 13



13/36

Motif I

RecJ_Tt	[73]	KR[RVHGDYDADG[TGTAI[VRGLAALG	[100]
RecJ_Ec	[73]	TR[IIVVGDFDADGATSTAI[SVLAMRSLG	[100]
RecJ_Aa	[78]	KRIIIYGDYDV[DGI[TGTAI[LYRVLKLLG	[105]
RecJ_Hp	[47]	TE[LVVGDYDADGV[SSAI[MAKFFESLN	[74]
RecJ_Hi	[68]	QK[IVIVGDFDADGATSTAI[SVLALRQLG	[95]

PPX1_Sc	[30]	TIC[VGNESADMDSI[ASA[ITYSYCQYIYN	[57]
PRUNE_Dm	[37]	HL[VMGNESQ[LD[SAV[SAVT[AFV[YAASS	[60]

Motif II

RecJ_Tt	[129]	SDLFLIT[VDCGITNHAELRE	[147]	[153]	VE[VIVITPHH[TPGK	[165]
RecJ_Ec	[131]	AQLIVTVDNGISSSHAGVEH	[49]	[155]	IPVIVITPHH[LPGD	[165]
RecJ_Aa	[133]	GDFLIITVDNGTSAVEEIDQ	[151]	[154]	LETVVIPHHNVPP	[166]
RecJ_Hp	[102]	APLIITVDNGINAFAEARF	[120]	[126]	YT[LIITPHHCLHH	[138]
RecJ_Hi	[126]	VQL[MTVDNGVSSFDGVAF	[144]	[150]	IR[VLVITPHH[LPPE	[162]

PPX1_Sc	[120]	ELNSYLV[DNNDTPKNLKNY	[138]	[141]	NV[VGIIDHHFDLQ	[153]
PRUNE_Dm	[88]	PLVCEMWDCRARVALPRRY	[106]	[129]	NV[TEILDHRPLED	[141]

Motif IV

Specific Motif

RecJ_Tt	[210]	YADLAAVGTIAD[VAPLWGW	[228]	[386]	DLLLR[GKKEAAGFAM	[402]
RecJ_Ec	[226]	LLDLVALGTVADVVPLDAN	[244]	[422]	GMMMLKFGGHAMAAGLSL	[438]
RecJ_Aa	[215]	FDLVALGLIADYMPVNPNV	[233]	[404]	DMFLKWGGHDKAMGLTL	[420]
RecJ_Hp	[189]	LLCLAGVATIADMMPLTFF	[207]	[372]	SLLLGYYGGHRQACGLSV	[388]
RecJ_Hi	[219]	LLDLVALGTIADVVPLDQN	[237]	[415]	NMILKFGGHAMAAGLSI	[431]

PPX1_Sc	[191]	IALLLMGAILI[DTSNMRRK	[209]
PRUNE_Dm	[183]	VAQLLHATIVLDTINFAPA	[201]

Tt : Thermus thermophilus HB8, Ec : Escherichia coli, Aa : Aquifex aeolicus,

Hp : Helicobacter pylori, Hi : Haemophilus influenzae Rd,

Sc : Saccharomyces cerevisiae, Dm : Drosophila melanogaster

FIG. 14



14/36

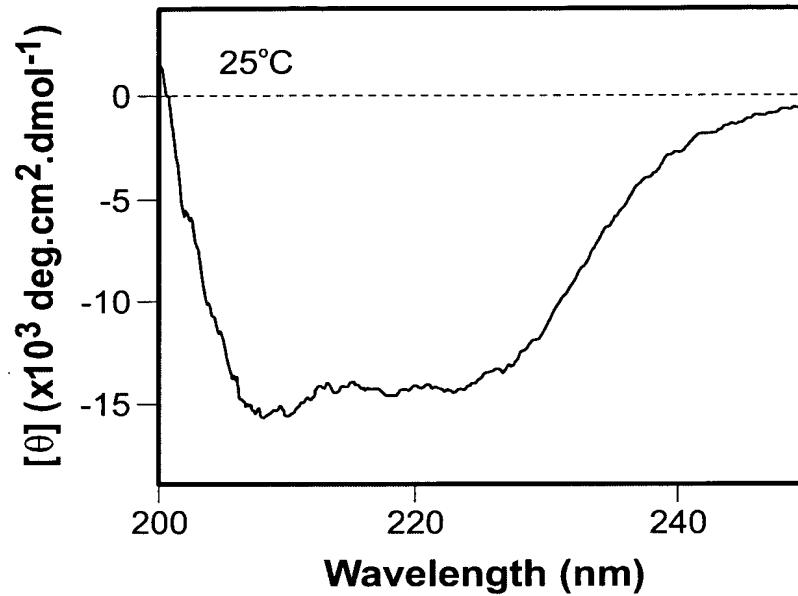


FIG. 15

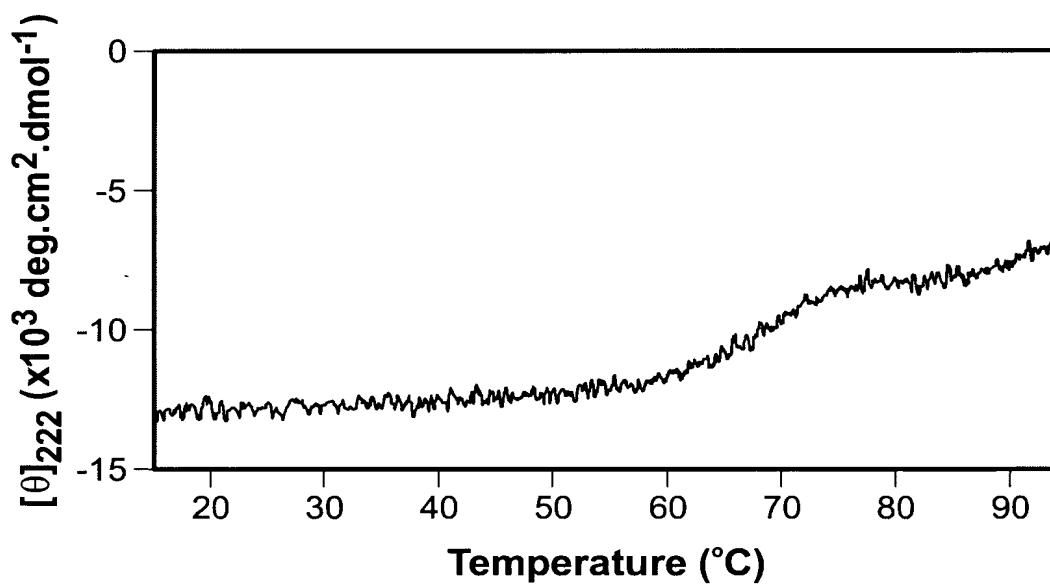


FIG. 16



15/36

Substrate DNA: 49' mer ssDNA

5' -ACTACTTGGTACACTGACGCGAGCACGCAGGAGCTATTCCAGTGCGCA-3'

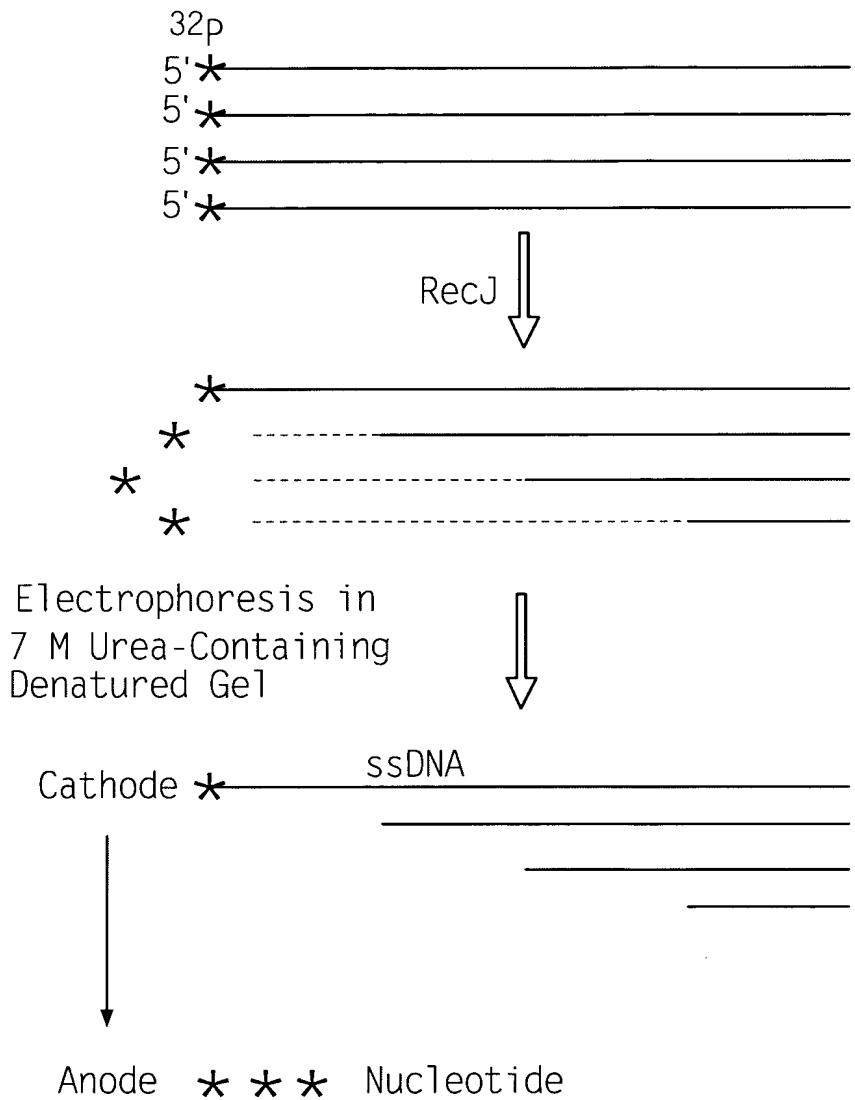


FIG.17

SEP 22 2004



16/36

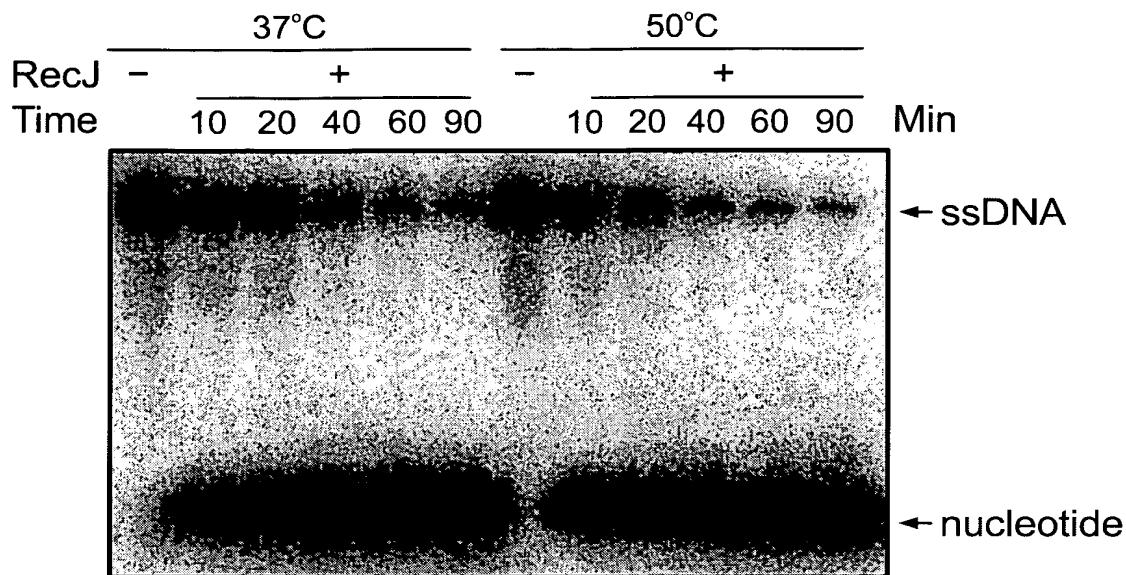


FIG. 18A

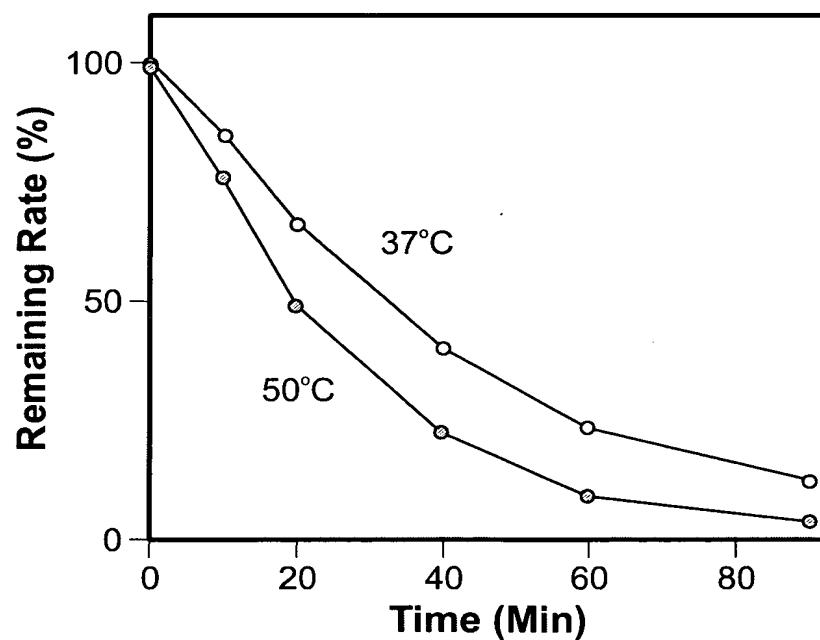


FIG. 18B



17/36

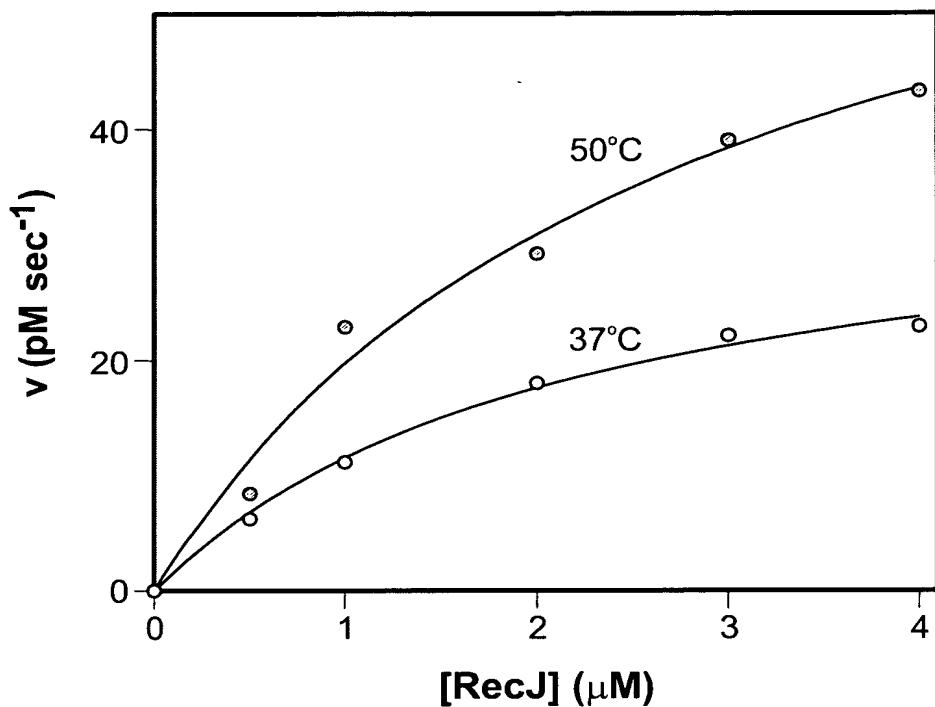


FIG. 19

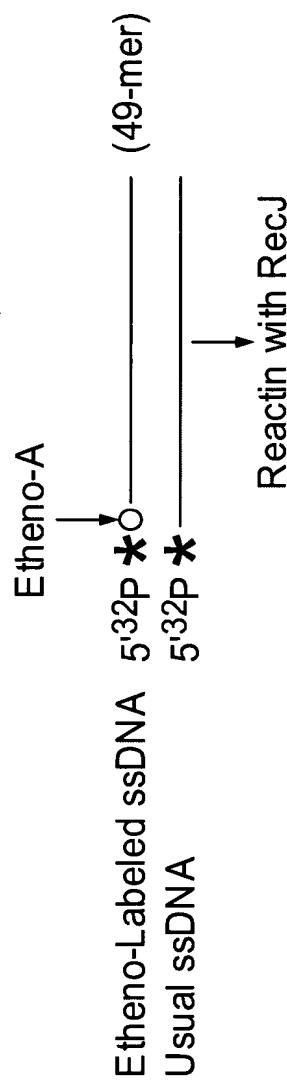
SEP 22 2004

JULY

2004



18/36



Comparison of Activity on Both DNAs by Gel Electrophoresis

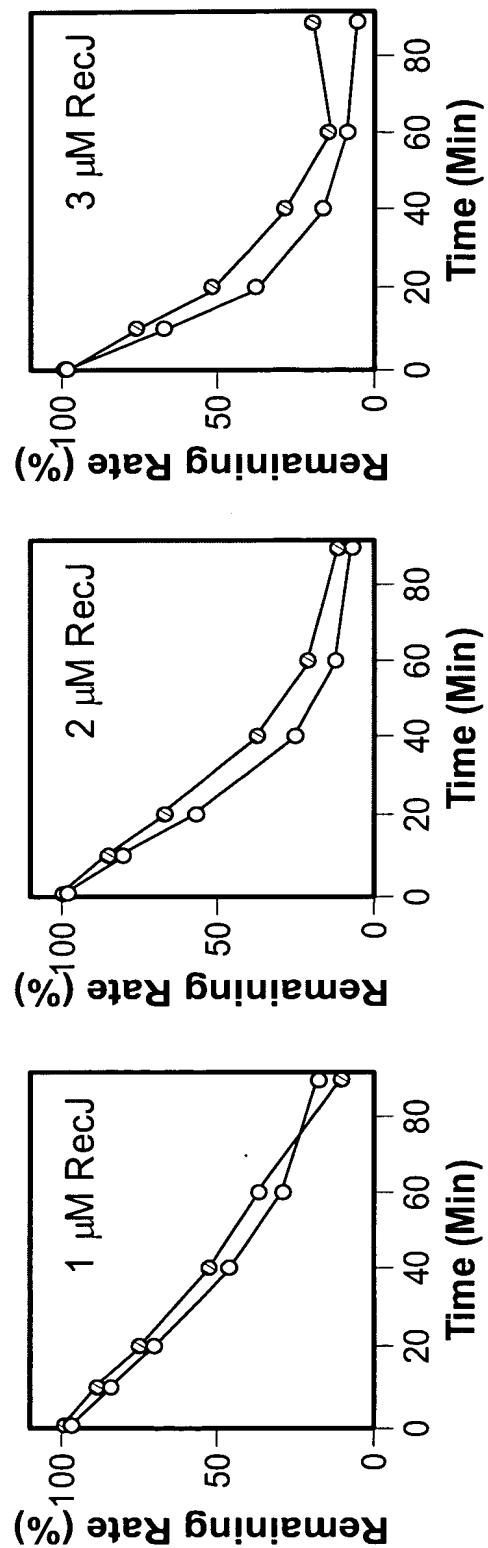


FIG. 20



19/36

**Substrate DNA : Etheno-Labeled Bovine Thymus
ssDNA (e DNA)**

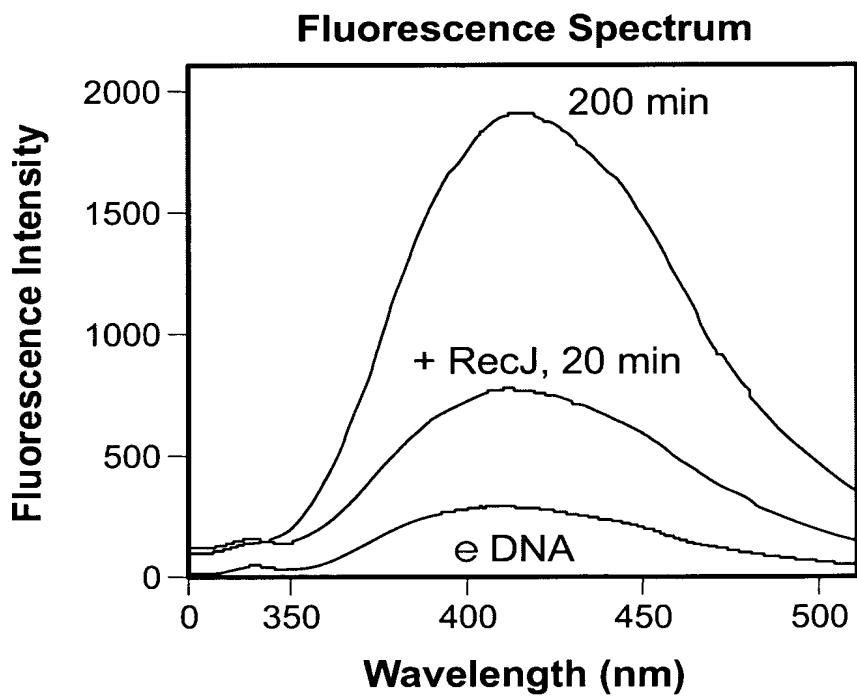
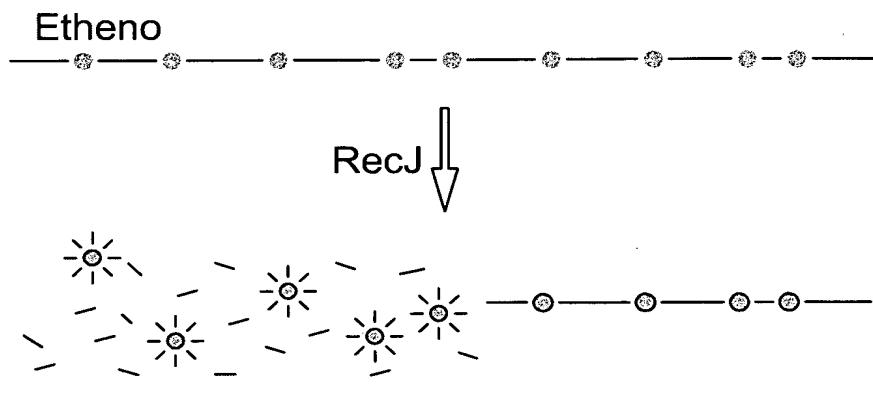


FIG. 21

SEP 22 2004

PTO
PATENTS & TRADEMARK OFFICE
C24

20/36

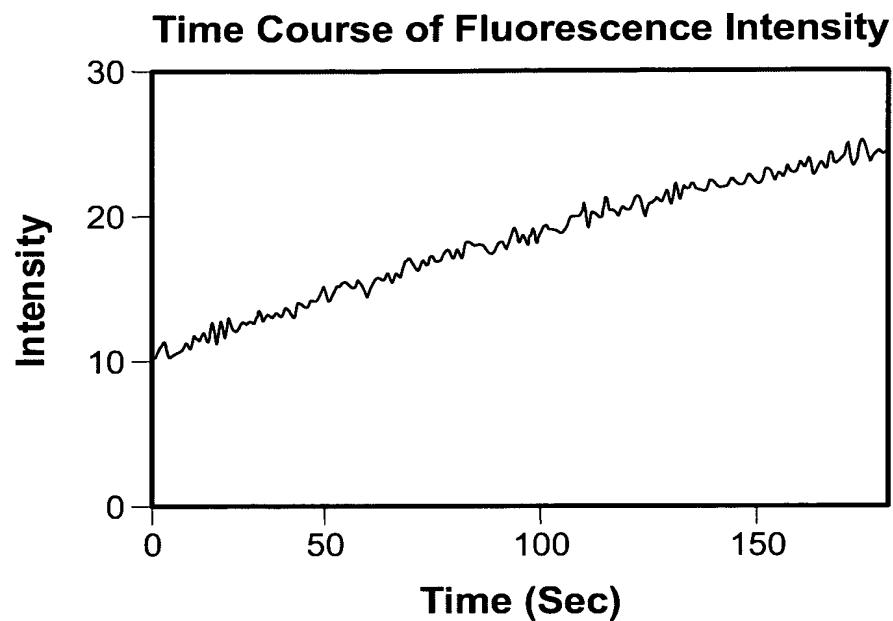


FIG. 22A

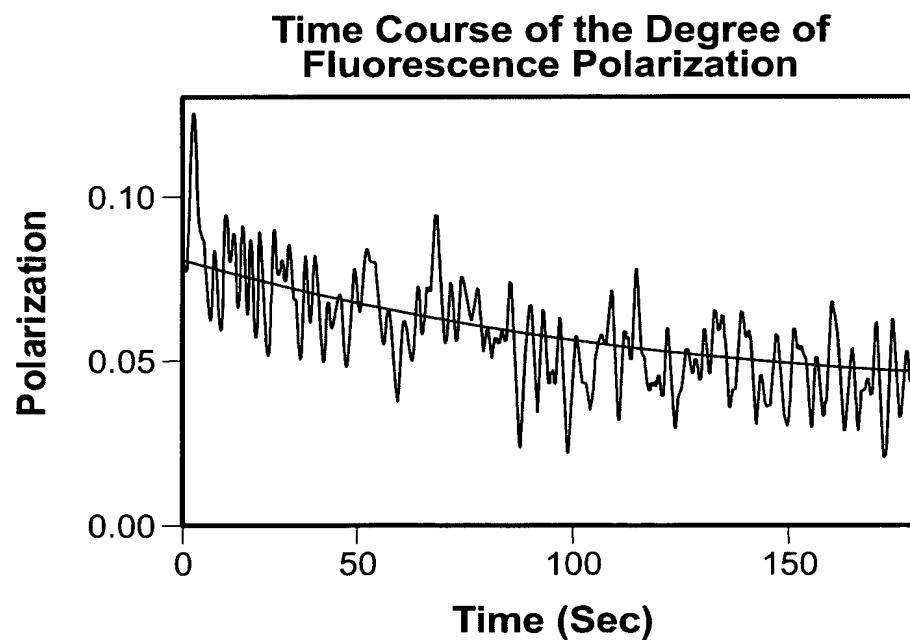


FIG. 22B



21/36

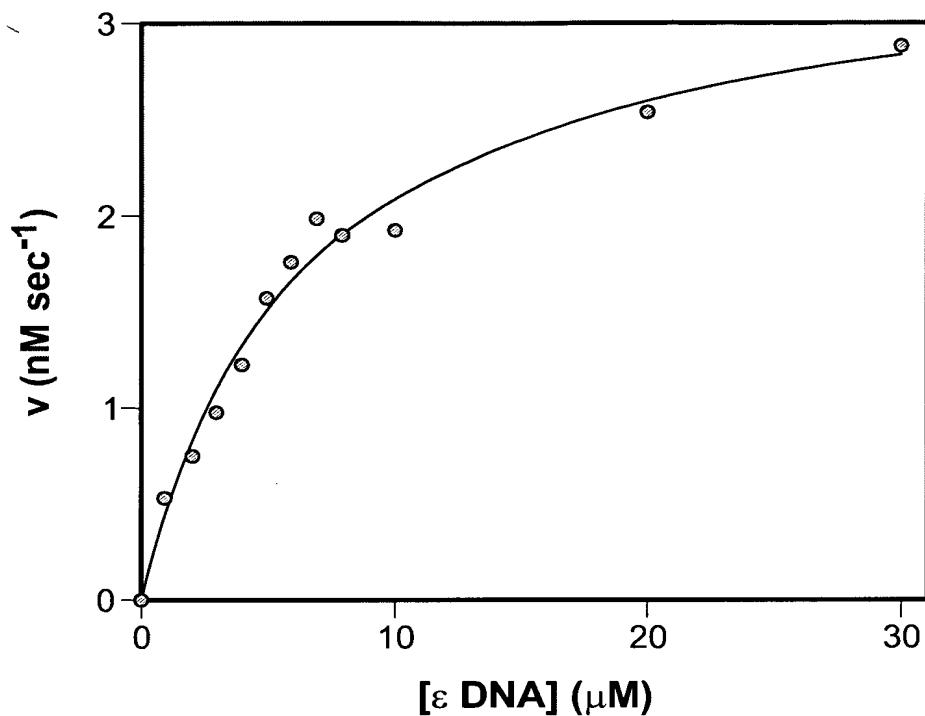
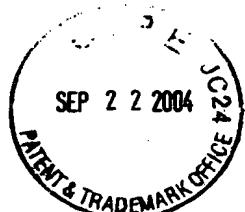


FIG. 23



22/36

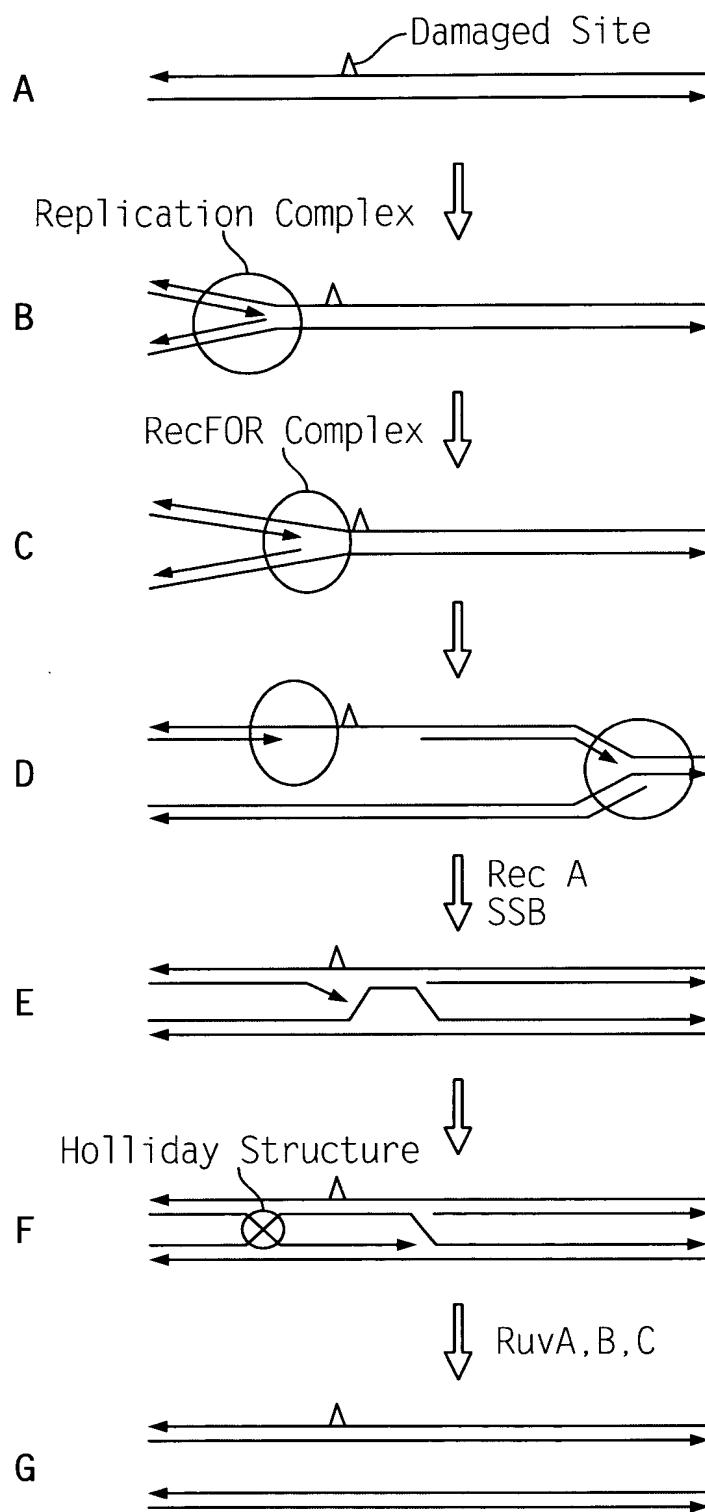


FIG. 24



23/36

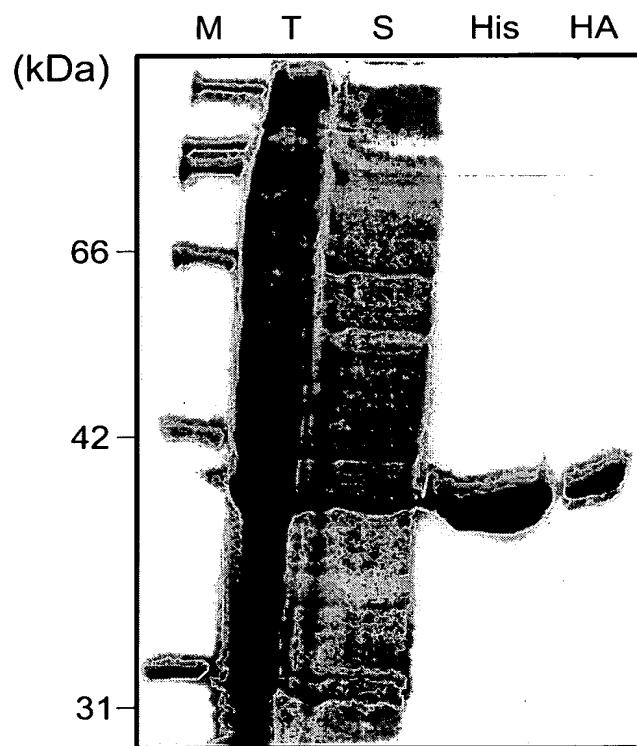


FIG. 25

24/36

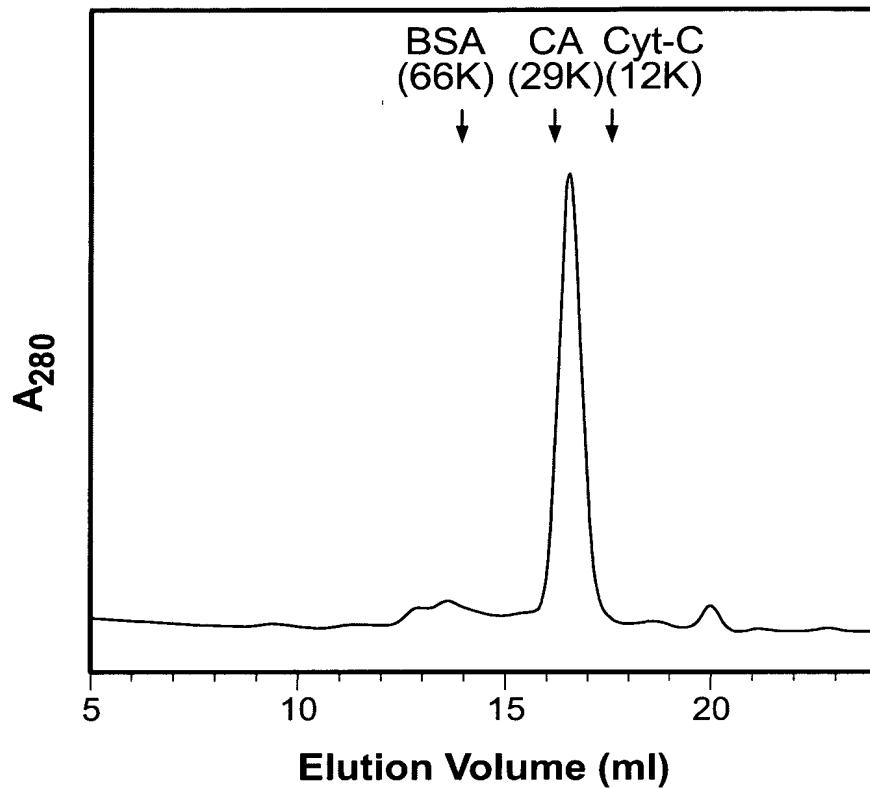


FIG. 26



NOVEL DNA REPAIR ENZYMES, NUCLEIC ACIDS ENCODING DNA REPAIR ENZYMES AND METHODS OF USING THEM

25/36

Tth: *Thermus thermophilus* HB8
Eco: *Escherichia coli*
Ppu: *Pseudomonas putida*
Bsu: *Bacillus subtilis*
Mtu: *Mycobacterium tuberculosis*
Dra: *Deinococcus radiodurans*

FIG. 27



26/36

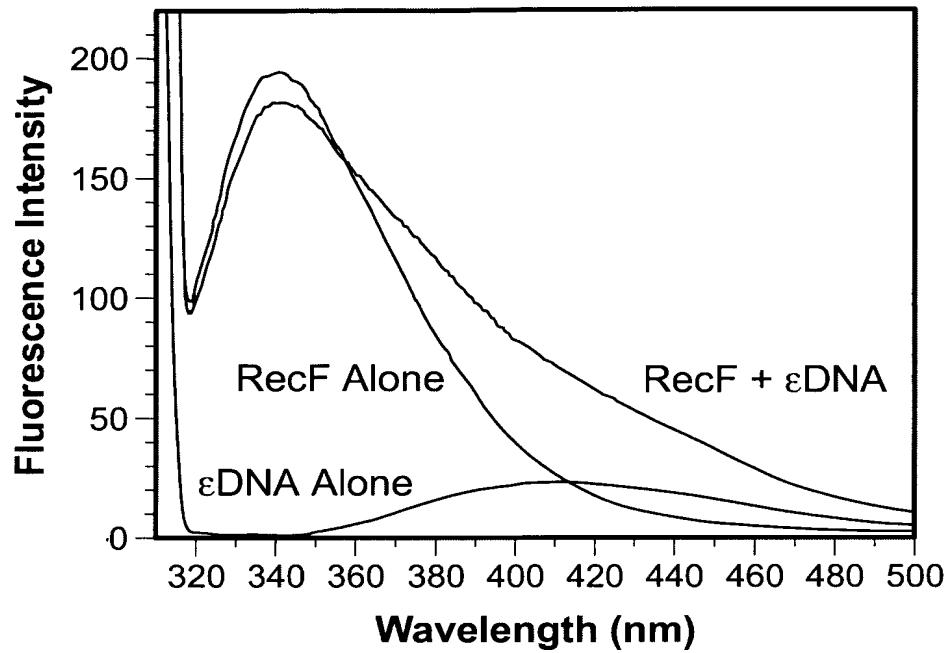


FIG. 28A

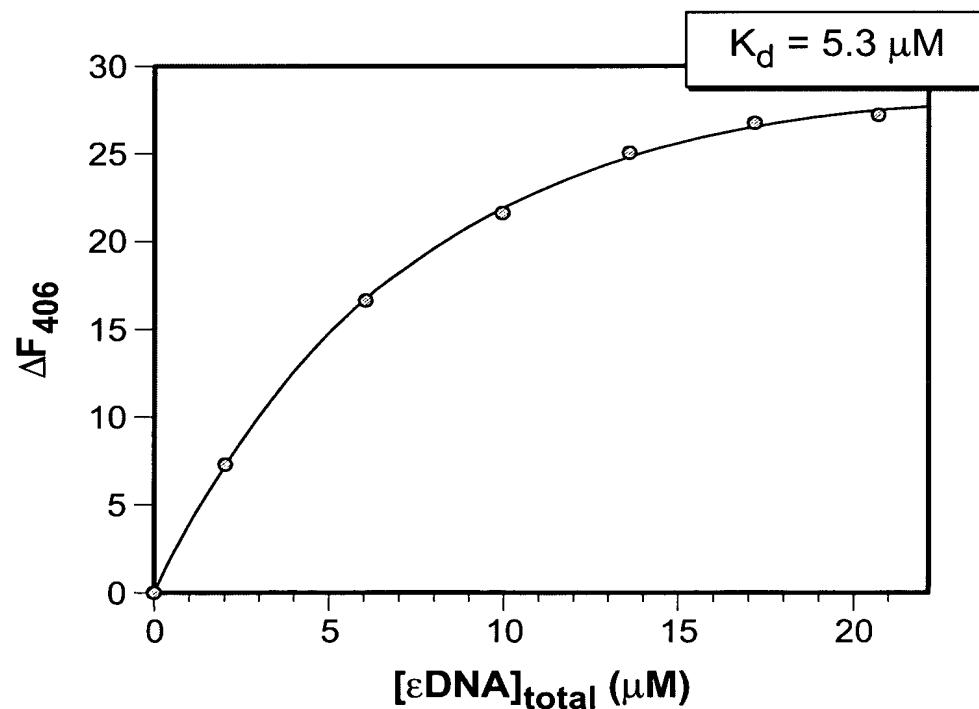


FIG. 28B

27/36

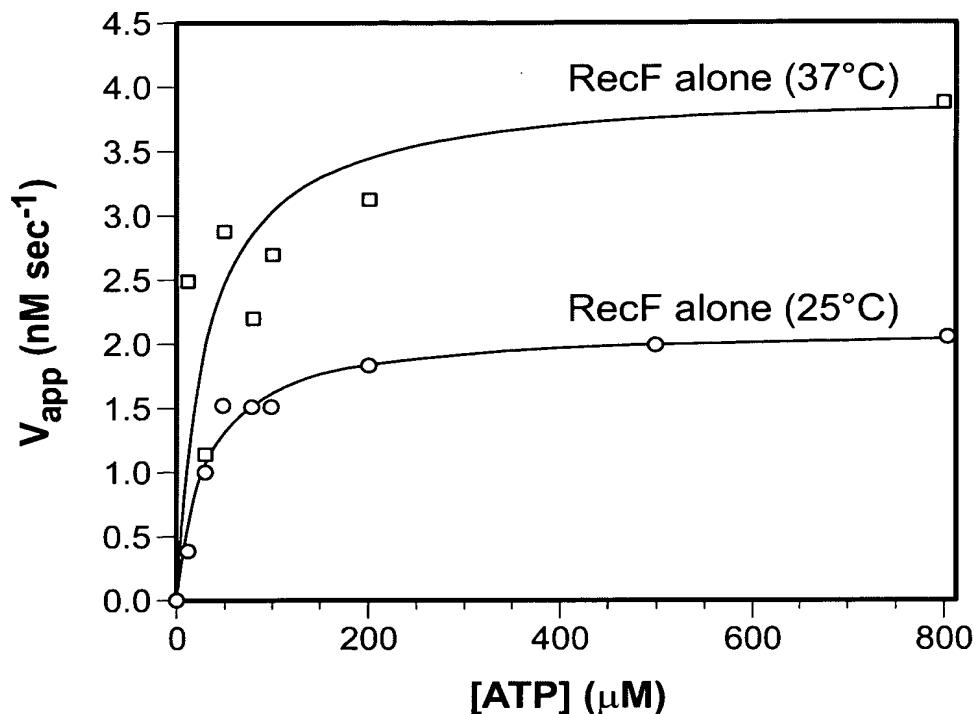


FIG. 29

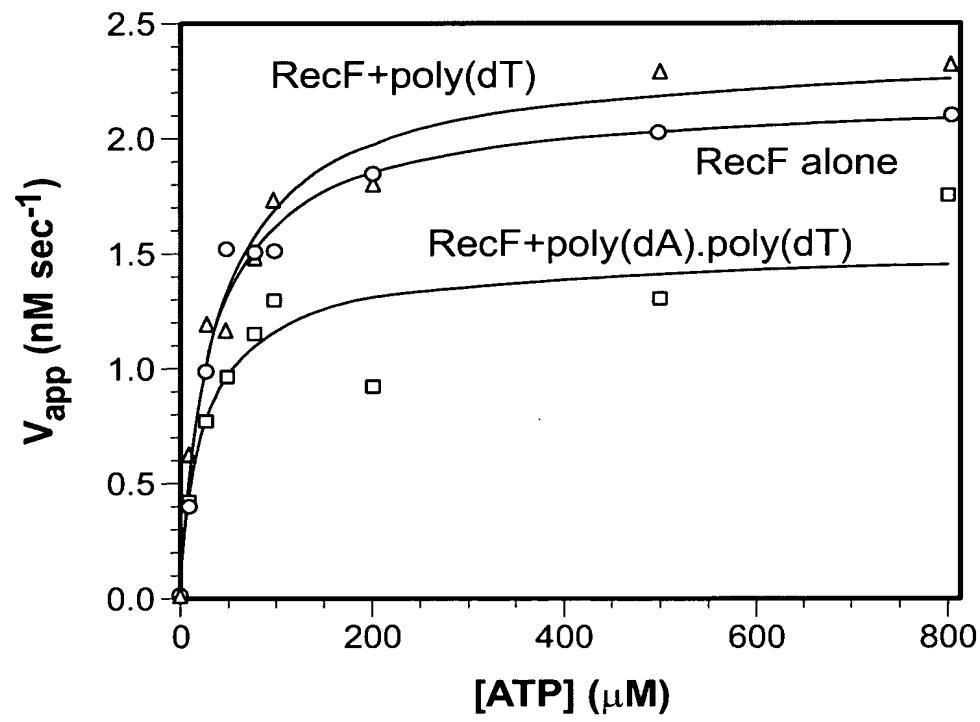


FIG. 30



28/36

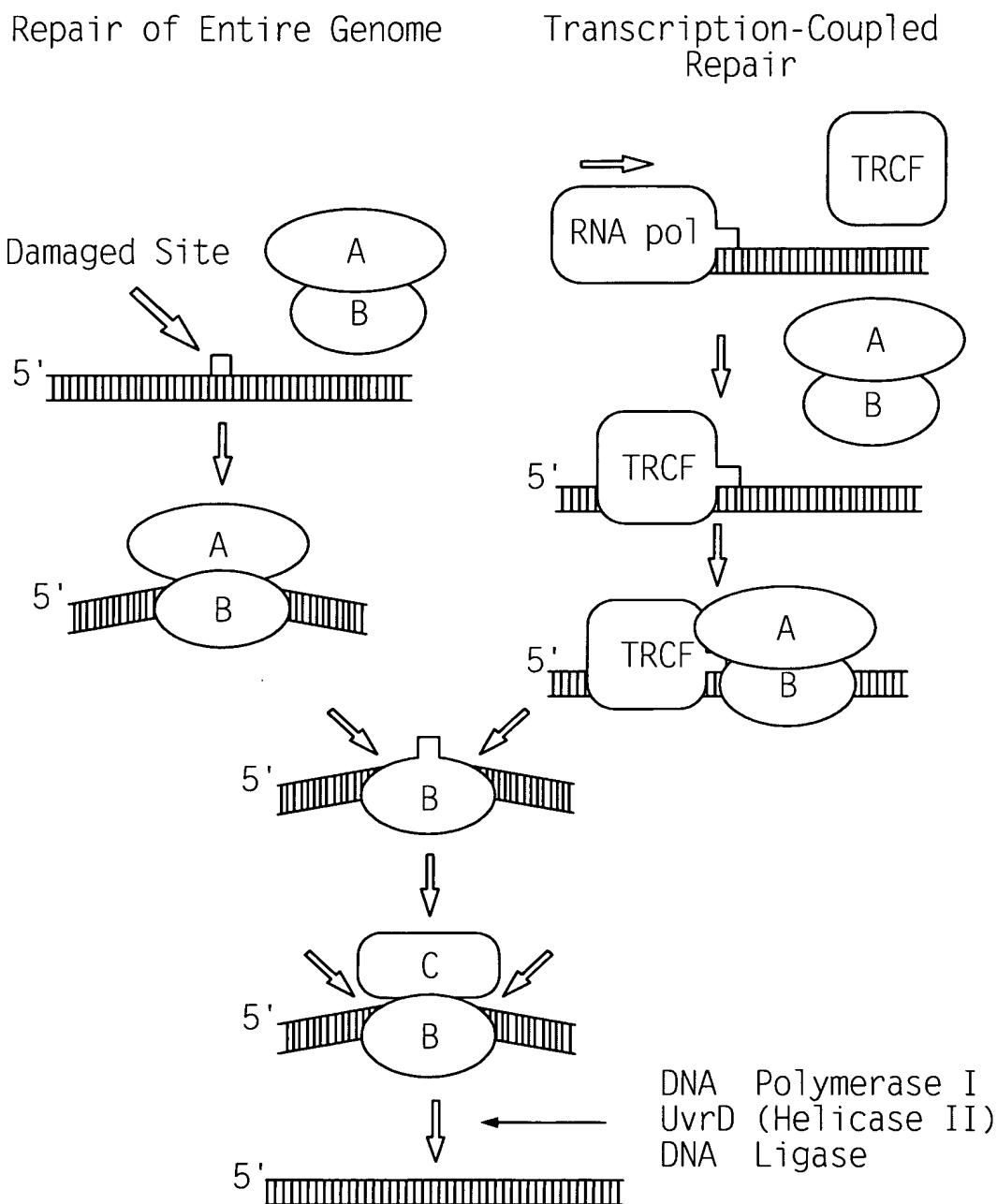


FIG. 31



29/36

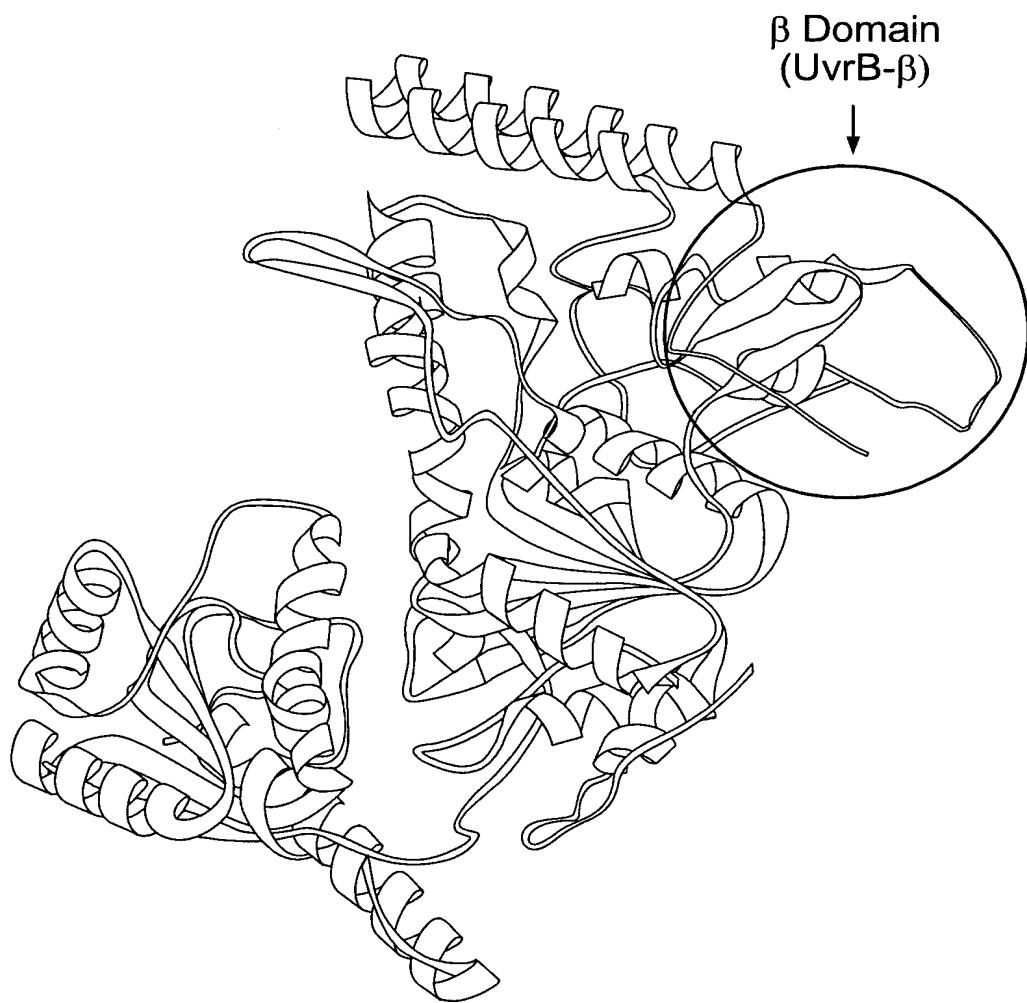


FIG. 32



30/36

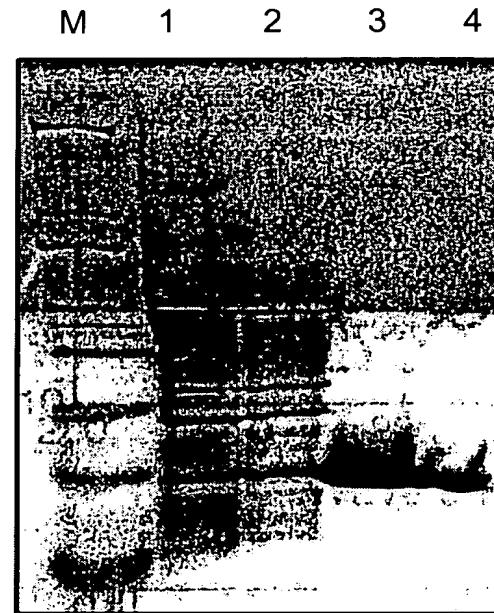
UvrB- β 

FIG. 33A

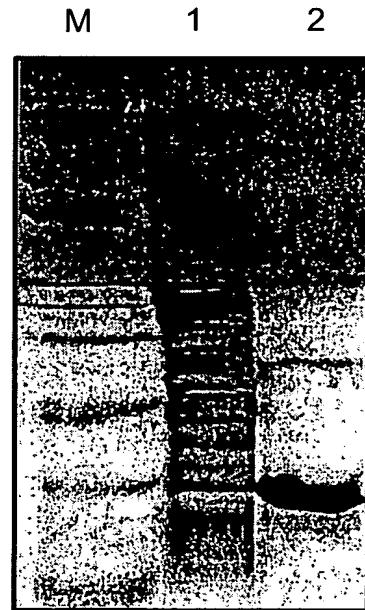
TRCF- β 

FIG. 33B



31/36

UvrB- β	154	RN[VVERGKPYPREVLLERLLE[GYQRNDI	184
TRCF- β	86	WR[LLE[VGRAYPRAALLSRLKLGYAR]---	113

* * * * * ** * *** * . . .

UvrB- β	185	DLSPGR[FRAKGEVLE]FPAYETEP[IRVLF	215
TRCF- β	114	DED---[YRVLGEVMELG-----EVRLLEFF	148

* * * * . . .

UvrB- β	216	GDEVERISQVHPVTG-ER[RELPG-----	236
TRCF- β	149	GDELERLVVRGEERRRHV[LPKPGKAEGFT	163

*** ** * . . .

UvrB- β	237	---FVLFPA	242	*Identical Amino Acid Residues
TRCF- β	164	SKKV[H]EPG	172	.Homologous Amino Acid Residues

**

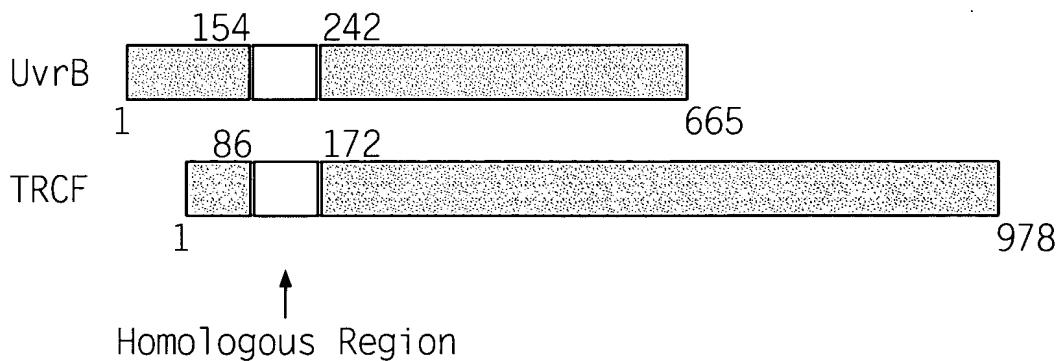


FIG. 34



32/36

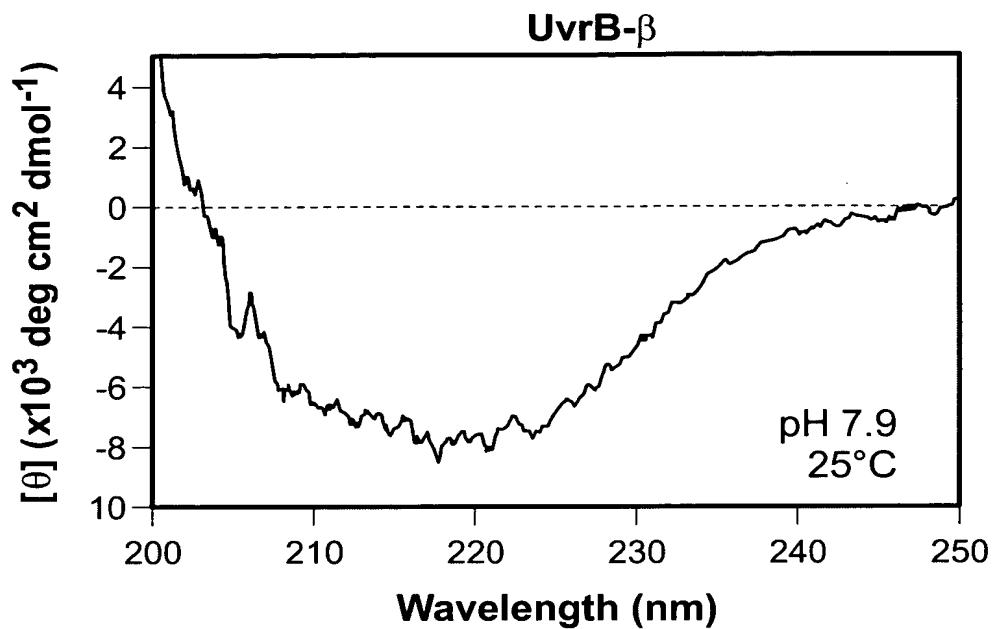


FIG. 35A

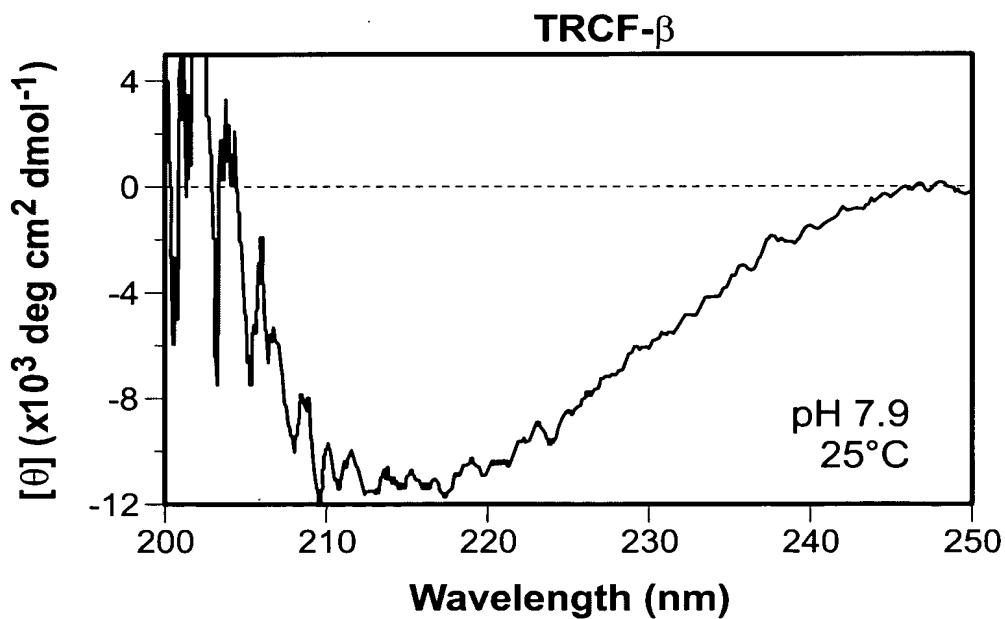
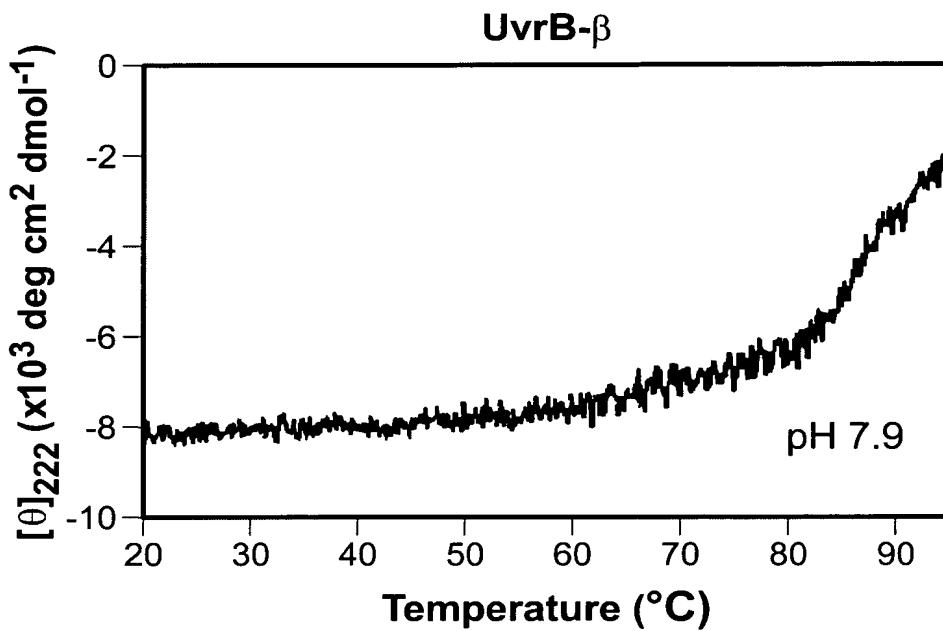
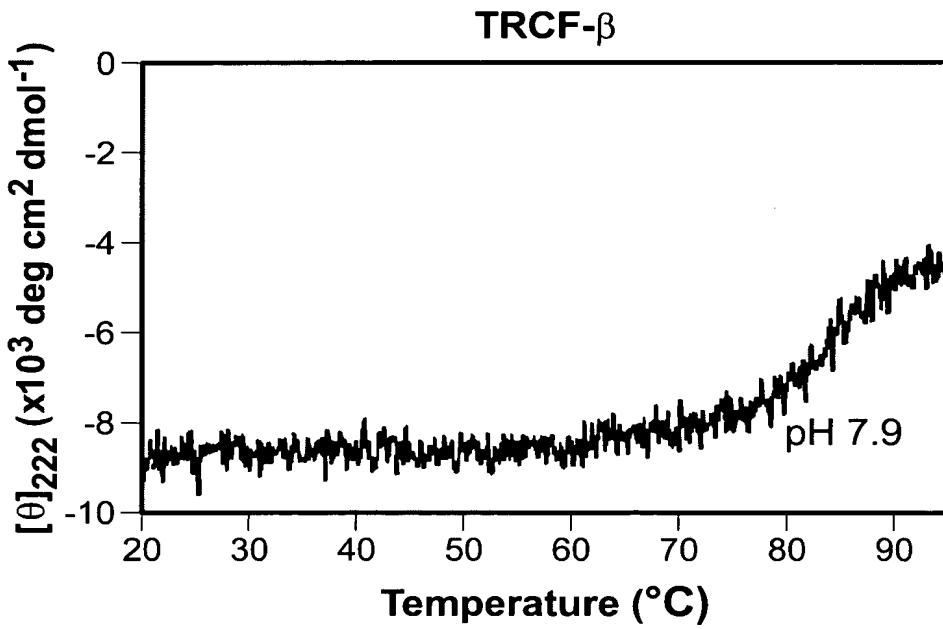


FIG. 35B



33/36

**FIG. 36A****FIG. 36B**



34/36

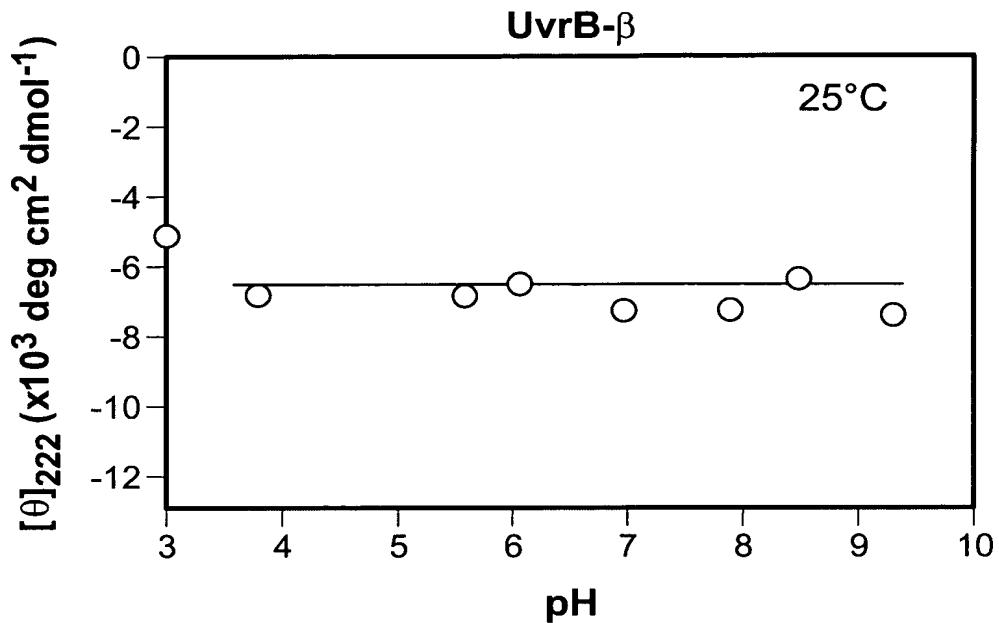


FIG. 37A

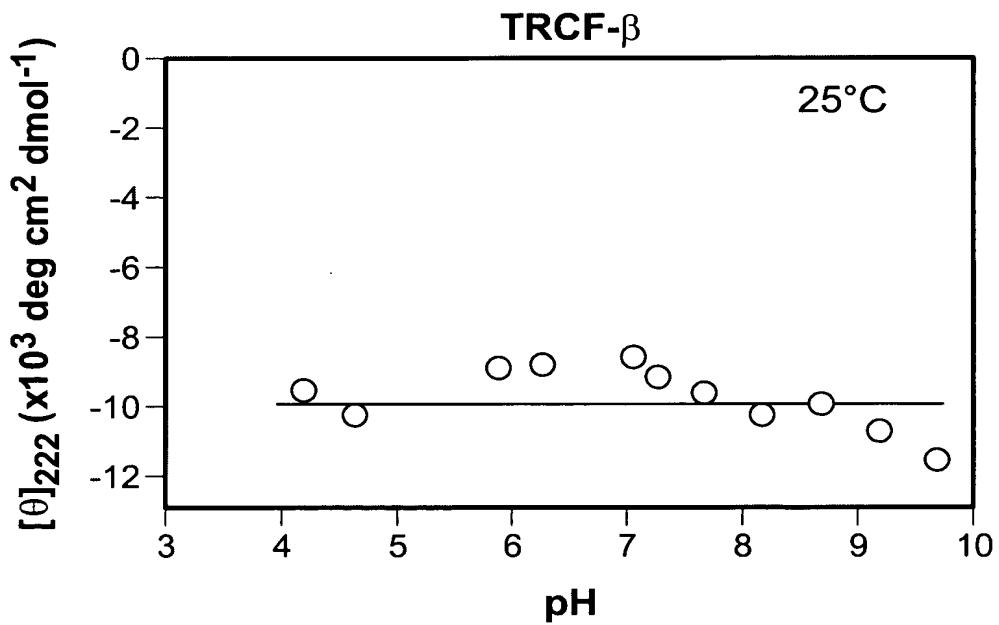


FIG. 37B



35/36

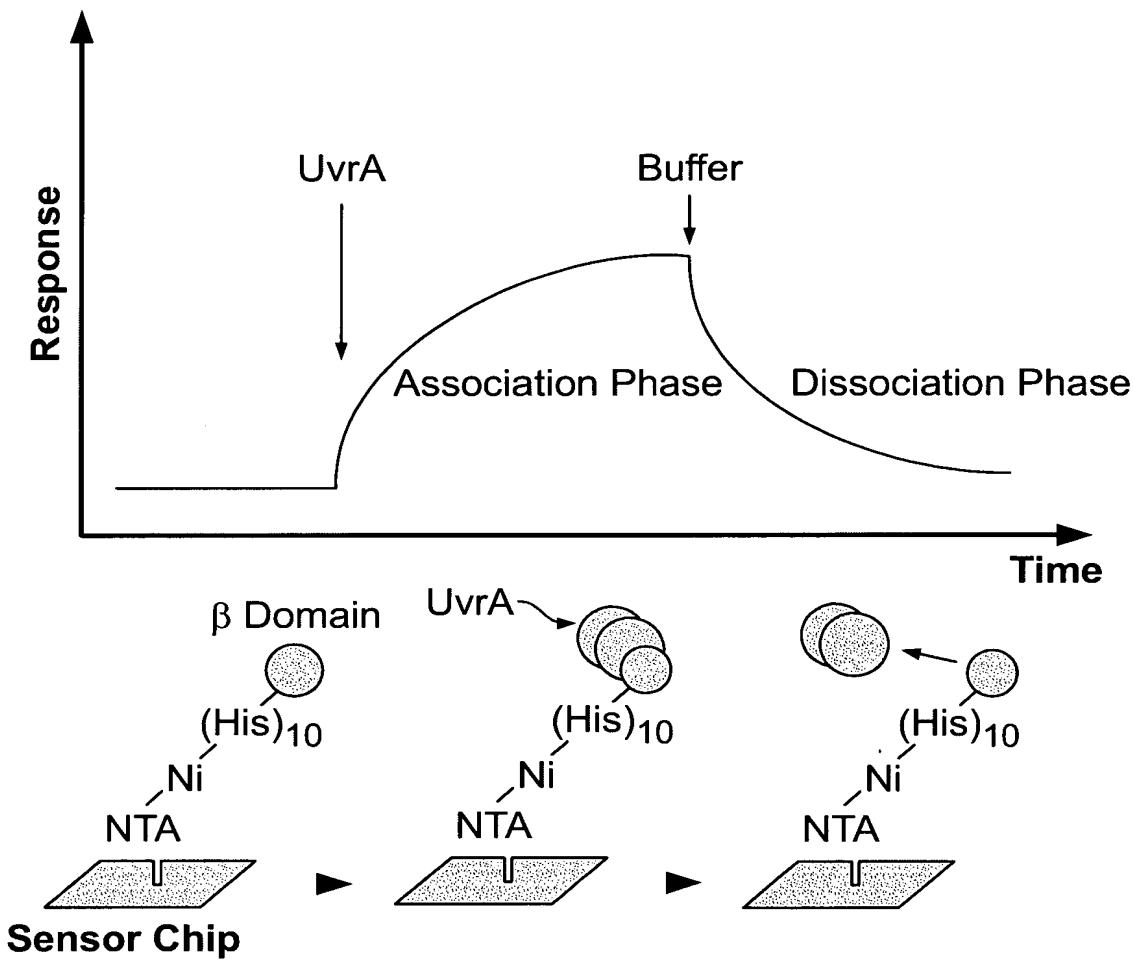
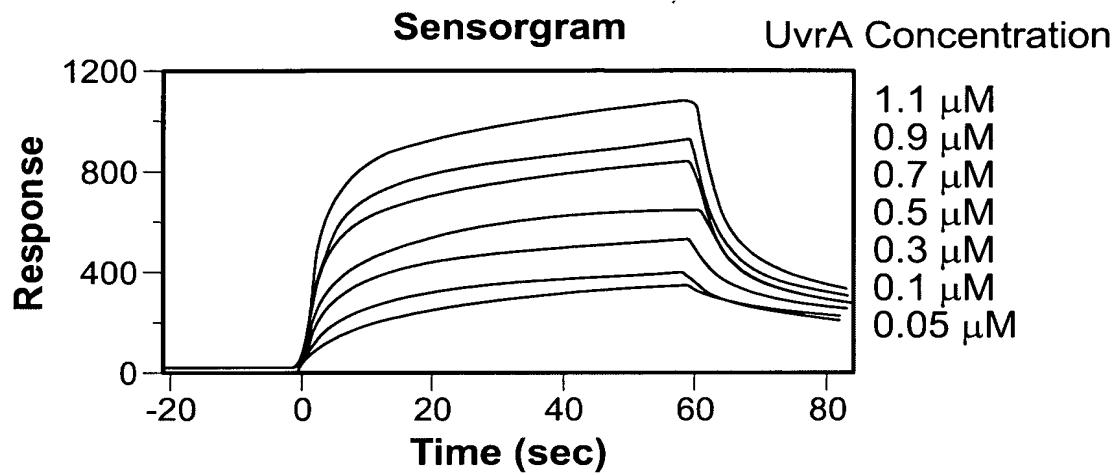


FIG. 38



36/36



Analytical Results

	K_d ($\times 10^{-6}$ M)	k_{on} ($\times 10^5$ M $^{-1}$ s $^{-1}$)	k_{off} (s $^{-1}$)
	-ATP +ATP	-ATP +ATP	-ATP +ATP
UvrB-b	2.6 0.4	2.0 1.5	5.2 0.6
TRCF-b	1.3 0.5	1.0 1.5	1.3 0.7

FIG. 39

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.